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The Builder

AN

ILLUSTRATED WEEKLY MAGAZINE

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

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FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—Sir Henry Wotton.

"Our English word To Build is the Anglo-Saxon Bylðan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—Diversions of Purley.

"Always be ready to speak your mind, and a base man will avoid you."—William Blake.

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*Hospital Construction and Management.**

IT is exactly a twelvemonth since we commented upon the first volume of a work on the above subject, published under the joint authorship of F. J. Mouat, M.D., &c., and H. Saxon Snell, F.R.I.B.A., &c. We had occasion to point out the fragmentary and somewhat confused arrangement, or want of arrangement, which characterised it as a literary effort, and deprecated the difficulty which was thus gratuitously added to the understanding of a complicated problem by unnecessary complication in its treatment.

The second part of the work just issued by the same authors is not free from the defects of the first, but, like the first, it contains much scattered information, which will repay a careful search. It is true that a general index is now added, and, so far, the reader has reason to be thankful; but, beyond this, he is left pretty much to his own resources in deducing any conclusions from the mass of miscellaneous and unrelated matter which goes to make up the book.

The authors modestly abstain from directly "formulating their own views and opinions on the questions treated" because they "demand a more profound study of the whole question than the time at our disposal admits of," and the omission will only, it appears, be supplied "if another edition of the work be called for."

Surely this is an unusual position for professional writers to take, who are presumably experts in their respective spheres. Their work amounts, practically, to this. "We give you plans and descriptions of a great many home and Continental hospitals, some criticisms thereon, and a few extracts from the reports of various Commissions who have from time to time looked into the subject: make what you can of them, and form your own conclusions. We are too busy building and managing hospitals to have time for the profound study which should precede the formulating of opinions on so serious a matter. If, however, you ask us for a new edition of our book we will throw you an opinion into the bargain; meanwhile, we hurl at you a miscellaneous assortment of modern plans and leave you to your own devices."

The late Mr. Street once, in the heat of discussion, called a learned professor's book on domestic architecture "an illustrated shop list," and it is a pity that something of this flavour does attach to so many of the works of professional men upon technical subjects, that they leave a sort of general impression that their object is to show there is only one man who does really understand this or that particular subject, and that man is the writer of the book.

As we have more than once pointed out, the hospital architect is dependent almost entirely upon the experience of the medical profession, and he can scarcely hope to do more than give effect, in the most perfect and economical way, to the recommendations which experience in the practical treatment of disease suggests.

Unfortunately, however, medical experts are by no means agreed as to hospital requirements. The aggregation of some hundreds of patients under one roof, or their segregation in huts of small capacity; the accumulation of story upon story, or the limitation of the hospital ward to a single floor; the shape of the ward, and the disposition of the beds; natural *versus* artificial means of ventilation, or the union of the two; and many similar matters, are open questions debated with more or less energy of advocacy and deprecation.

Perhaps the most exhaustive and valuable amongst the several published contributions to the literature of the subject is the joint official report of Drs. Holmes and Bristowe; and thus they deliver themselves on one fundamental principle of hospital planning, after a close study of the whole question of hospital construction, and personal examination of almost every example in the United Kingdom and on the Continent:—

"If all the subordinate parts of a hospital have been well constructed, the *size* of a hospital is a matter of absolute indifference; whether it contains 100 or 1,000 patients does not appear to exercise the least influence on the health of any individual in the hospital. At St. Bartholomew's Hospital four floors are used as wards, and no difference is perceptible between the healthiness of the different stories. Allowing that each ward is healthy, and that, say, thirty patients may be placed in each ward, we see no reason to doubt that it is safe to put 100 wards together, and accommodate 3,000 patients in the same hospital."

"No more permanent hospitals," says Sir James Simpson; and his view is supported by the opinion of many authorities. "They must be replaced by hut hospitals. The permanent hospital is the Sepulchre Hospital,—*nothing* can render it wholesome. The hut hospital, wholly or partially renewed every ten or fifteen years, *alone* possesses the hygienic conditions necessary for the abodes of disease."

And the problem receives another element of complexity in the fact that the statistics of some of the most perfectly constructed modern hospitals contrast unfavourably with others "full of every fault which can be united in the same building." Whence some writers on the subject have too hastily deduced that the construction of the hospital goes for nothing, and

* By F. J. Mouat, M.D., &c., and H. Saxon Snell, F.R.I.B.A., &c. London: Churchill & Co.

that *all* depends upon the administration; the records of the new Lariboisière, and others of its type, being quoted against the cleaner health bill shown by the outrageously faulty old Leeds Infirmary.

Another instance of the divergence of medical opinion is provided by the opposite recommendations of the English and Belgian Commissions on the orientation of hospital wards, the former recommending an axial line running north and south, the latter being quite clear in favour of a line running east and west.

In view of such important differences in skilled opinion the outsider can only keep cool, weigh the several reasons adduced on either side, and draw what lessons he may from such historical facts, and such clear statistics of results as lie within his reach.

The history of hospital construction and management is a sad one. The earliest hospitals were simply big houses, haphazard conglomerations of rooms without special fitness of arrangement, into which the sick were crowded indiscriminately. Such refinements as the separation of infectious from non-infectious cases, the limitation of the number of the sick to the capacity of the room, or the provision in any special way for the sick as such, were undreamt of. The pictures of neglect and suffering which rise up before us in perusing the history of the Hôtel Dieu, for example, are not only terrible, but sickening. It is almost incredible, though unfortunately but too true, that a century ago "the extraordinary spectacle was to be seen of two or three small-pox patients and several surgical cases, and sometimes even four parturient women lying in one bed." The writer's feelings get a little the better of his grammar, and he does not altogether mean what he writes; but, when due correction is made, his statement is sufficiently startling. It is known, moreover, from the official records of the time, that the unfortunate wretches were turned out of their miserable beds periodically to allow those still more unfortunate sufferers who had been waiting their turn on a ledge at the bed's foot to take their short interval of rest (?). In 1515 each of the 303 beds of this particular hospital held eight, ten, or twelve sick poor "so crowded that it was pitiable to see them." Modern civilisation has no doubt sins of its own to answer for; but the horrors of the casual ward are elegance and comfort compared to this hideous refuge of disease and destitution. So bad was the condition of nearly all similar institutions that the chances of recovery in them were less than if the patients were left untended in the public streets! And so uniformly fatal were certain surgical operations which are now performed with perfect safety that the surgeons abandoned the practice and simply left the sufferers to die.

The Rev. W. K. R. Bedford, reported in the *Lancet* of November 19th, 1881, concerning the hospital built at Malta in 1575, by the Knights of St. John of Jerusalem, says:—

"It was situated on the south-east side of Valetta; the site is the lowest on that side of the town, and all the ground falls towards it. The drains of the town were, and still are. discharged into the sea close to the building The hospital was exposed to the sirocco, and protected from the healthy north and north-west winds. The windows in the wards were small and high, and along the seaward sides niches were arranged, one to every two beds, which were used as latrines. Some later buildings shut out both light and air from the wards. So that the hospital builders of that day were ignorant or careless of the deleterious effects of sewage emanations, a low situation, bad ventilation, gloom, and the depressing influence of the relaxing sirocco."

Some of the older hospitals in this country were scarcely more intelligently planned, and many still remain in which the arrangements are almost as bad as they can be.

The abominable old Hôtel Dieu has been replaced, as every one knows, by a palatial structure, at a cost of a million and a half,—each bed costing the prodigious sum of 1,215*l.* in building alone,—and, with the cost of the land, more than double that sum. Unfortunately the money has been ill-spent. The defects of the well-known but unfortunate Lariboisière have been repeated and exaggerated, and the new building is, by the unanimous verdict of the medical faculty, "a magnificent structure, but a detestable hospital, absolutely contrary to the fundamental principles of hospital sanitary law."

We are not without similar examples of the mistaken application of large sums of money in the endeavour to provide for our sick, and the best way of avoiding similar mistakes in future is a full discussion in the press and elsewhere of the whole subject in its multifarious bearings.

Setting aside matters of detail, it is pretty well agreed that the following points are of primary importance, to wit:—

1. A dry, open, healthy, and ample site.
2. The proper classification of cases.
3. The provision of ample lateral space in the immediate region of each patient.
4. The provision of a sufficient cubic space or air volume about the patient.
5. The rapid and complete removal of all morbid emanations from the sick.
6. Sufficient sun-light.
7. An agreeable and steady temperature.
8. Facilities for nursing in each ward.
9. General facility of supervision and administration of the whole.

It must never be lost sight of that the one object to be attained is the speedy recovery of the sick, and that to this all other considerations should give way. And there is a preponderance of skilled opinion in favour of Sir James Simpson's dictum, that of all forms of hospital, the isolated hut is the most favourable for the end in view.

Accordingly, the practice of hospital building which abandoned the corridor type for the pavilion of many stories, although the former was not without professional defenders, is in turn abandoning that type for the hut.

In towns hospitals will no doubt continue to be built on the pavilion plan,—reducing the number of stories and increasing the intervals between the blocks as much as possible; but the hospital of the future will probably be an assemblage of one-storied huts raised upon hollow basements, quite isolated, and built either of impermeable materials or of such as may be periodically destroyed or renewed.

The new hospital at Genoa is lined with a thin brick wall for subsequent removal, and the Moabite Hospital at Berlin has been built expressly with a view to the successive destruction of the huts of which it consists when the termination of the healthy life of each shall have been reached. It is now a well-established fact that buildings, like human beings, may be "miasmatically poisoned," and that by the absorption of the emanations from the bodies of the patients, hospital wards become positively a danger instead of an assistance towards the recovery of their occupants.

We have not, as yet, had sufficient experience to fix the average duration of such a hut as above alluded to; but it is probable that on merely economical grounds the change will be justified, for the least expensive of permanent hospitals costs 200*l.* or so per bed, whereas there are examples to prove that the hut hospital and its accessories, including the administration, can be suitably erected at a cost only slightly exceeding 80*l.* per bed.

The remarkable success of the Tollet form of hospital plan and construction, which we have several times adverted to in the *Builder*, has directed attention to this form of hospital building, and the daily increasing list of impervious vitrified building materials will, in all probability, enable architects to combine permanence with the other advantages of the hut type.

The last new thing in hospital building is the circular form of ward simultaneously invented in Belgium and England, although like many inventions pre-invented, advocated by Dr. Sanderson, Professor Marshall, and others, and carried into execution on a large scale at Antwerp, and on a small one in a few cases in this country.

It may be found easy to ventilate such a ward by a central "aspirator," and there is no doubt something to be said for the facility afforded for destroying in a central fire, or otherwise, the disease germs which are exhausted with the effete air of the ward; but it is quite easy to ventilate the rectangular ward, and, as stated by us in our previous notice, we shall be surprised if this form of ward eventually makes its way. It is, however, a fair subject for discussion, and a profitable discussion of the matter will be helped by the experimental hospitals now being erected on this system, and we may treat the subject in greater detail hereafter. As to the Antwerp Hospital, we expressed our opinion in noticing the first portion of the present publication.*

Although the Continental architects have in some matters bettered the instruction they have received from us, and we have much to learn from their latest works, they in turn are still far behind us in all sanitary arrangements, and even the new model Hospital at Baltimore, the result of an examination of the best modern hospitals of Europe, is far from perfect in this respect.

The principal value of the book before us consists in the careful record of what other nations are doing in hospital construction, as shown in the numerous plans and sections. Especially useful for practical men are the tables of the cost, accommodation, floor space per bed, and other particulars of the principal European hospitals. All who are engaged in hospital design and construction may learn much from the labours of the authors, and will find that it is a veritable mine of information for those who have the courage to work it.

STRUCTURAL AND PICTORIAL BEAUTY.

IN any inquiry into the question of the identity, or otherwise, of structural and pictorial beauty, it must be observed, in the first instance, that neither adjective is adequate to cover, and exclusively to cover, the group of phenomena that rank under the title. It may at first be thought that there can be little doubt as to what is meant by beautiful structure. Even as to that, however, there is something to be said. But by the term pictorial may be meant something far wider than the elements usually called picturesque,—such as beauty of landscape, of colour, or of studied adornment. In the most subtle meaning of the expressions there may, indeed, be an underlying unity. But it is rather to illustration than to definition that we must have recourse in attempting to trace a comparsion or a contrast.

What we understand, then, by beauty in structure is something which appeals to the intelligence and to the judgment, as affording the most perfect appliance for carrying out a definite purpose. It is, so far as our powers of discrimination go, the evidence of design,—of the application of perfect skill to carry out a distinct object. It admits of no error, whether in excess or in defect. It displays the true method of the production, or the counterbalance, of force. If we grasp this idea, it will enable us to bring forward instances of structural beauty in which what we usually regard as structure,—that is to say, rigid structure,—is wholly absent. In the ever-varying curves of a freely-springing fountain, we trace the constant play and balance of natural forces. For no two seconds of time do the graceful forms remain the same. Yet at all times (pressure and other conditions being alike) there is a certain amount of identity. The most abstruse mathematics (we may cite the recent work of a learned French hydraulist, M. Gräeff, in support of the assertion) fail to trace the behaviour of a single filament of water. And yet the eye and the mind are at once completely satisfied by the perfect manner in which nature, under such conditions, asserts the never-failing certitude of mechanical law. The same remark will apply to the grander forms of the like action, as seen in the mighty wave of the incoming tide, or in the leap of a mountain cataract. In each of these cases it is the perfect and truthful form, ever changing but ever the same,

* *Builder*, July 7, 1883, p. 4.

that charms the eye. Let the sun come from behind a cloud, and span the foam of the cascade with a rainbow arch, and in the addition of colour to form we have the perfection of pictorial beauty.

We speak of the ever-varied forms of moving water, evincing, as they do, the unfailing action of mechanical law, as an illustration of structural beauty, for the reason that this excellence is not often very easily to be detected by our powers of observation in the inorganic world. It may almost be said that it is only when motion, of a kind readily to be grasped by our senses, is present, that the term applies. It is to the organic kingdoms of nature that we must turn for the most apt illustrations of beauty of structure; and the instances that there occur are chiefly notable as being contrivances for resisting or producing motion.

The most perfect examples of structural beauty are to be found in the animal kingdom, and notably, from the mechanical point of view, among the birds. The skeleton, or rigid structure, of a swift, of an eagle, of a stork, or of an auk, — different as one type is from another,—is in each case a perfect mechanical provision for the special motion habitual to the bird. But, taking that rigid structure alone, there is a total absence of pictorial beauty. There is no waste of unseen finish or ornament. The roughness, useful for the attachment of the muscles, the inelegant but perfectly mechanical swelling at the joints, the hollow shafts of the columnar bones,—all structurally admirable, — are not agreeable objects in themselves. In the human form, of which we,—perhaps not the best judges,—speak as the most beautiful of all forms in nature, the bones are a subject of undisguised terror to a child. Even when they peep too prominently from under the skin they are ever regarded as unsightly. Of all the osseous parts of the human structure but one group has any pictorial beauty. The teeth are beautiful, sometimes very beautiful, but the teeth are intended to be seen.

In the animal organisation, therefore, while the whole mechanical structure of skeleton, tendon, and muscle is admirably adapted for locomotion, there is no attempt at pictorial beauty in detail or in sum. The beauty which enchants the eye in the animal is, as it were, draped around the mechanical structure, as unnecessary to it,—for mechanical reasons,—as is the iris to the waterfall,—but yet, when produced, essentially aiding the perfection of imaginative excellence. It is thus with the texture and colour of the human skin, with the plumes of birds, even with the scales of fishes. Work,—or the power of work,—seems to have been first regarded; and when the dynamical problem has been exactly solved, the creative power of nature may be said to have indulged itself in the addition of wonderfully-varied exterior beauty.

It is one thing to trace a subsidiary utility in a beautiful form, and another to attempt to attribute all that we consider beautiful to teleological or to self-acting causes. To those who will, perforce, adopt no other than a rigidly utilitarian point of view, let us offer the compromise of physiognomic truth. That certain combinations of form or of colour suggest certain ideas to the human mind there can be, we think, no doubt. Where beauty is imperfect, admiration may be matter of individual taste. But not so where beauty is perfect. From the time when the verse of Homer glowed with the reflection of the grace of Helen, there has been no more doubt as to the charms of that fatal cause of war, or of those of Cleopatra, than there is as to the melodious quality of the notes of the nightingale.

Akin to this instinctive perception of beauty is that equally instinctive physiognomic perception which appears to be much more highly developed in children, and in animals familiar with man, than it is in the civilised adult. It is easy to understand why such should be the case. On the other hand, it is held by those who are admirers of Lavater that a truly scientific study of physiognomy is possible, the outcome of which shall unite the keen impressional sense of the child or of the savage with the orderly conceptions of the philosopher. However this may be, let us regard such a detail as what has been called "the actor's feature," the eyebrow. Nothing in the face, of which the will can control the expression, is more expressive than the eyebrow. The change which emotion can give to its form, slight as it is, is in the highest degree significant. The eyebrow has been spoken of as a contrivance for keeping dust out of the eyes. That in some infinitesimal manner it may so act may be allowed. But a keen ridge of bone, shading the eye like the poke of a cap, would probably, for optical purposes alone, be a far better arrangement. Again, for those who believe that there is no such thing as species in nature, but that each existing living type is only a chance item in the course of continued self-evolution, the explanation that the eyebrow is a *remanet* of the original hairy covering of the faces of our bestial progenitors labours under the disadvantage that the bony orbit of the brow would have been one of the first parts of the frame from which the hair would have been rubbed off by the destructive friction of daily habit, and mutual intercourse. Neither utility nor "survival" can account for the existence, the constancy, and the wonderful variety of what we may call this capricious feature. It may be regarded from the artist's point of view alone; but if it be required to add a reason beyond that of the production of pictorial beauty, it is only to be furnished by physiognomy.

One peculiarity of architecture, to which that fascinating study may probably owe no small portion of its charm, is the mode in which it combines structural and pictorial beauty. Examples of this may be taken from various styles, schools, and periods of architecture, but the most conspicuous illustration of the remark is to be found in the Classic orders. Thus we trace, first structural purpose, and then a gradually increasing mastery over durable and beautiful material, which adds all the charm of what may be called skin beauty to structural proportions that gratify the perception of weight (if that be the faculty by which we judge of stability). We may hesitate to admit the descent of Helen from a gorilla; but we instinctively recognise the filiation of the Corinthian column, perfect in the maiden graces of its proportions, from the humble timber "upright." Indeed, that idea of *remanet*, survival, or homologue, which we are wont to consider as special to organic life, may be traced in such architectural features as the triglyph; pictorially beautiful, no doubt, in the form which had become conventionally fixed by the age of Pericles, but none the less bearing the unmistakable stamp of its constructive and wooden origin. The structural beauty of a Greek temple may be said to result from the truthful skill with which the nobler material of marble has been substituted for the humbler material of wood, in carrying out what we may call the apotheosis of the hut. In the process of architectural change the surface beauty of which the nobler material is susceptible has been added to the grace of outline. But it has not been added as "decoration," or "*appliqué* work." It sits as close to the structure as does the blush to the human cheek or the iridescent plumage to the sunbird or the bird of paradise. There is a union, or rather unity, in the two elements or kinds of beauty in such a building as was the Parthenon, that holds almost more nearly to the handiwork of nature than to its feeble imitation by man.

To draw the line between the work of the engineer and that of the architect has long been a matter of delicacy, not to say of dispute. Nor must we forget, in this case, the truthful dictum of Linnæus, "*Natura non facit saltum.*" Thus there is one group, and that a most important group, of buildings, of which it may be difficult to determine the character as appertaining to the province of the architect or of the engineer. We mean, of course, the lighthouse. But, as a general rule, we think the remark may be ventured that the province of the engineer is to deal with structural beauty alone, and that he may, in fact, have been wonderfully successful in the production of a hideous, but truly mechanical, structure, such as the hollow beams of the Menai bridge. But an ugly structure, however scientifically or economically perfect, is not a credit to an architect. To the attainment, therefore, of high rank in his profession there is necessary an element with which it is not needful that his brother,—son of Vulcan as he may be,—should be endowed, — the gift of artistic taste.

NOTES.

THE case of Barlow *v.* The Kensington Vestry, which came before the Court of Appeal on the 26th ult., alters the law in regard to the frontage of corner-houses as laid down by Vice-Chancellor Bacon in the Court below. As we pointed out (vol. xliv., p. 374) in commenting on the decision of the Vice-Chancellor, this case was of the utmost importance, because it practically laid down the law in regard to corner houses. This was, in fact, a house in Kensington-road with its front door in that thoroughfare, but it had its side not only in De Vere-gardens but also a part of the building projecting beyond the line of frontage as laid down for that street by the Superintending Architect of the Metropolitan Board of Works. Shortly put, the Vice-Chancellor's decision was that the house was not within the terms of Section 75 of the Metropolis Management Amendment Act, 1862, because it was in Kensington-road and not in De Vere-gardens, and, therefore, so long as it did not extend beyond the line of frontage in the road it was immaterial if its side extended beyond the line of frontage in De Vere-gardens. On the other hand, the Court of Appeal decided that a corner house could be in two streets, and, therefore, the fact that it was nominally in one only did not prevent it being also in another. Unless we are greatly mistaken, the effect of this decision would be, if strictly observed, to make a number of corner houses liable to be pulled down, since many appear to be built in the same manner as the house in the Kensington-road. We regard the general result of this decision with satisfaction because any judgment which increases our open space, by however small an extent, does a service to the community. On the other hand, we think the owner of this house is really to be pitied as having been the unfortunate *corpus vile* on which this useful experiment was tried, and also because the Kensington Vestry should never have allowed the house to get so far on as it did before taking legal steps. We may also commend to the notice of local authorities the remarks of the Court, that these provisions of the Act are so strict that they should be watched by judges and magistrates with great jealousy.

THE Hellenic Society held their annual meeting on Thursday of last week, the Bishop of Durham, president of the Society, in the chair. While glancing at the attractiveness to scholars of Hellas proper as a field of investigation, he suggested that the ground which had actually fallen to the lot of the Society in Asia Minor was possibly even richer in matter of archæological and historical interest. He made two special suggestions,—first, the thorough investigation by competent persons of the monastic and other libraries of the East; secondly, the mapping out by the Society of subjects to be worked upon by competent young scholars, who would devote time and labour to their solution. Mr. Newton, in a subsequent speech, spoke strongly in deprecation of the apathy of the English Government and of Englishmen generally in regard to archæological investigation of this class; observing that when the German Government grant for the excavations at Olympia was exhausted, a sufficient sum was at once raised by private means to continue the work. We heartily echo the spirit of Mr. Newton's criticism, and hope that the labours of such a body as the Hellenic Society will not be without their influence on the general tone of English feeling on the subject, sooner or later. The next number of the "Journal of Hellenic Studies" will not appear till the autumn.

THE Metropolitan Board of Works have wisely determined to appeal against the magistrate's decision dismissing a summons taken out by the Board, as we mentioned a fortnight since, against a builder who proposes to build upon a disused burial-ground in Peel-grove, Bethnal-green, in which, it is stated, upwards of 20,000 interments have been made. The summons was taken out for an infringement of the By-law made by the Board under the powers conferred by the Metropolis Management and Building Act Amendment Act, 1878, which provides that no house shall be built upon a site covered with animal, vegetable, or fœcal matter. The magistrate, in dismissing the summons, stated that in his opinion the Board had mistaken their remedy. In the case of the disused graveyard attached to Whitefield's Chapel, Tottenham-court-road, which was proposed to be built upon a few years ago, the parish indicted the builder for a misdemeanour; he was tried at the Old Bailey and convicted, and the building scheme was abandoned.

IN effecting certain alterations on the premises of Messrs. Tylor, at Warwick-square, near Newgate, some interesting Roman remains were discovered, which form the subject of a recent communication to the Society of Antiquaries. Mr. Alfred Tylor, the writer, is not content with describing the objects brought to light, the chief of which were a handsome stone vase, 2 ft. 3 in. high, with solid stone (porphyry or serpentine) handles and four leaden *ossuaria*, but has made them the text of a discussion upon certain points connected with the Roman occupation. He maintains that it was the metallurgical wealth of Britain which gave the island importance in the eyes of the Romans, and that the Britons had acquired considerable skill in the working of metals long before the Roman invasion. From a very early date the export of tin was a prominent branch of British commerce; steel scythes, home-made, were used, and iron was largely employed in the construction of chariots, and for other purposes. These are well-known facts; but Mr. Tylor also asserts that working in lead or plumbing is a native industry, and that it is more likely that the Romans learned the art in Britain, where the metal is plentiful, than that they taught it to the conquered nation. The *ossuaria* found in Warwick-square (about 18 ft. below the surface) are, however, specimens of Roman leadwork, and the ornamentation upon two of them is remarkable. One coffin bears a representation of Sol in his four-horsed chariot,—symbolising the passage from light to darkness,—and another has upon the inside a star of eight points, which, in the opinion of Mr. A. Tylor, has reference to the worship of Mithras. The eight-rayed star has, indeed, been claimed as a Christian emblem, and as a modification of the common symbol, Chi-Rho (X. P.); but Mr. Tylor contends that it is just the other way, and that the eight-rayed star,—Assyrian in origin,—was, with other emblems, adopted from Paganism by the early Church, and thenceforth invested with a new meaning.

IT is much to be desired that the authorities would consider the question of the ventilation of some parts of the Law Courts. During the present hot weather the windows on each side of the First Court of Appeal are open, and thus a very pleasant but very dangerous draught is caused. If the windows are kept shut, the atmosphere of the Court becomes intolerably close, so that those whose business it is to be present must run the risk of being stifled or having a sharp attack of cold or neuralgia. Again, the atmosphere of the corridors is exceedingly close and disagreeable; they rival in bad smells the worst of the old Westminster Courts, and, so far from relieving the atmosphere of the adjoining Courts, they make it worse. This state of things is quite to be expected, because these corridors are crowded with persons, the seats in the windows being the scene of many consultations and conversations; they are very low and entirely unventilated, even the small windows in them are never open. These corridors are, in fact, one of the most unsatisfactory features of the building,—they are quite dark in winter, and in summer their atmosphere is quite poisonous. Alterations to the windows, and some method of ventilation, are absolutely necessary.

THE advance of public feeling with respect to the Manchester Ship Canal was signally displayed in the House of Commons, in the short debate that preceded the second reading of that measure, on the 26th ult. One or two members, who represented the interests which have been the chief opponents of the canal, admitted that they could no longer oppose the second reading, and confined their efforts to demanding a "strong committee," a point as to which the promoters of the canal are fully in accord with the speakers in question. The probability, or otherwise, of damaging the navigable character of the Mersey by the attempt to improve it, is the sole *locus standi* to which the opponents of the Canal are now reduced,—a fact which renders the more valuable that citation of the unbiassed opinions of the profession, when no scheme of improvement was on the *tapis*, to which we called attention in our last number.

THE London and Middlesex Archæological Society's Excursion to Rochester and Strood, on the 26th ult., was very numerously attended, owing, no doubt to the favourable weather, and was a decided success. The Cathedral and Castle were described by Mr. W. H. St. John Hope, of The Vines, Rochester, Assistant-Master of Rochester Grammar School, who has recently made some interesting discoveries of the foundations of portions of the conventual buildings beyond the present cathedral precincts. The same gentleman described the Corporation regalia, and Mr. Ferguson, of Carlisle, gave an impromptu sketch of the history of civic regalia. Restoration House, the residence of Mr. Stephen Aveling, was visited, as were also the building known as Watts's Charity and Eastgate House, High-street, formerly a ladies' school, and the supposed scene of Mr. Pickwick's escapade, but now converted into a Working Men's Club. At Strood the local antiquities collected by Mr. Humphrey Wickham were described by Mr. C. Roach Smith. The company dined together in the evening at the King's Head Hotel, Rochester.

AT the approaching Church Congress at Carlisle one of the important features will be an ecclesiastical art exhibition, part of which will be a Loan Collection, intended to afford special opportunity of comparing modern with ancient work. The collection is intended to comprise ecclesiastical metal work, embroidery, wood and ivory carving, paintings, drawings, photographs, books, and MSS.; and the clergy are particularly appealed to for the loan of communion plate and any movable articles of archæological interest belonging to their churches. Mr. William Nanson is the Local Secretary for the Loan Collection.

TWO months ago we called attention (*Builder*, April 19, p. 537) to an intended exhibition of works of decorative art in precious stones, ceramic, glass, and other wares, to be held in Paris in August next, giving the classification of objects to be exhibited. In a circular letter we have received from the Department of Science and Art we are asked to call attention to the subject again in relation to some communications which have taken place between the French Government and our own Foreign Office in regard to English co-operation in this exhibition. On the 2nd of May last M. Waddington sent a note to the Foreign Office requesting that English workers in the industries included, viz., "art objects in stone and wood, pottery, ceramic wares, enamels, glass, crystal, and mosaics" should be invited to contribute to the Exhibition. This note was enclosed by the Foreign Office to the Science and Art Department, who wish it to be made known that the French Government are desirous of specially inviting English workers to exhibit,—an invitation which we have no doubt will be amply responded to. Those who wish for the precise statement of the classes of objects to be exhibited will find it, as before observed, in our last volume on the page given above.

AN interesting demonstration of some of the manifold purposes for which electrical energy can be utilised was given on Friday evening last, at 6, De Vere-gardens, the residence of Sir Daniel Cooper, who had invited a number of gentlemen interested in the subject to see what could be done by means of accumulators or storage-batteries. The reception-rooms were brilliantly illuminated by one hundred and fifty 50-volt Swan lamps of 20-candle-power arranged in two circuits, each worked by a storage-battery of twenty-four cells, of the Faure-Sellon-Volckmar type, which have been previously described in this journal. Each cell contained sixteen pairs of lead plates, measuring 10 in. by 9 in., and they were supplied by the Electrical Power Storage Company. The lamps had been running for several hours on the previous evening, and the accumulators had not been recharged, but there was no symptom of diminished brilliancy in the lights, which were, if anything, rather too bright, particularly in the dining-room, and all were burning with that absolute steadiness which the use of accumulators ensures. As the installation was only of a temporary character, no attempt had been made to conceal the cables or to provide special fittings for the lamps, which were attached to existing brackets and gaseliers, and, with excellent effect, to three armed candelabra in the dining-room. In addition to the lighting, several applications of the energy stored in these batteries to motive power were shown; for instance, a small fountain was worked, a lathe was driven, and a miniature tramcar made Liliputian journeys in the library with regularity and despatch. There were also exhibited an incubator in which the proper temperature was maintained by the electric current, and two forms of *caloriferes*, invented by Mr. Sellon, of which one was in the shape of a foot-warmer. The fact of no engine whatever being required ought to make these accumulators in great request for temporary installations at balls and banquets, as the batteries can be placed in any out-of-the-way corner; but for general purposes the weight of the cells is undoubtedly a drawback, as the cost of carriage for any distance to or from a dynamo-machine for the purpose of recharging must be heavy.

THE House of Commons having thrown out the Thames Crossings Bill, so far as it related to the proposed subway between Nightingale-lane and Bermondsey, the Board at their meeting last week received a report from their Parliamentary Committee recommending that the portion of the Bill relating to steam ferries at Greenwich and Woolwich should be abandoned for the present. The logic of this decision (for the report was adopted) it is not easy to understand. Most people would see in the circumstance an additional reason for proceeding with the ferries scheme, which is the most rational and practical portion of the whole.

THE case of "Wright *v.* The Midland Railway Company" occasioned some remarks from Mr. Justice Field the other day, which railway travellers would do well to make a note of. The case was one arising out of a fatal accident from the deceased person having apparently walked over the line in front of the train he was waiting for, and which it was admitted he knew was coming, as he crossed the line because he heard it approaching, and was on the wrong side for it. The Judge observed that while railway companies were bound to take all proper steps for securing the safety of their passengers, the latter were "not expected to part with their common sense and care upon a railway." This is a side of the relation between railways and the public which is apt

to be forgotten. From the evidence in the case referred to we should say that the unfortunate man met his death through want of the most ordinary common sense in walking straight before a train without looking how far off it was or how fast it was coming; and the fact is that the travelling public on railways are, in these matters, "mostly fools." We hinted one day to a porter who had twice drawn our attention to the fact that a train was coming (while waiting to cross the line), that we could see a train as well as he could. He replied, "There's a many of 'em that can't, sir!" and that is about the truth of it. But it is hardly reasonable that grown-up persons should expect to be taken care of on a railway as if they were babies.

THE "Cathedral of St. Finn Barr, Cork, has not much appearance of architectural antiquity. It was mainly rebuilt between the years 1725 and 1735. The choir is lighted by *a fine Venetian window*. The interior, 97 ft. by 57 ft., has a richly-panelled ceiling which rests upon ranges of Ionic pillars of scagliola. The north and south *galleries* are supported by Doric columns." A usually well-informed illustrated contemporary has the assurance to print the above for the edification of the Philistine, under date June 28th, 1884. Shade of Burges! Shall the hard measure dealt out to thee during life pursue thee beyond the grave?

IN our usual list of meetings for the week will be found the announcement of a remarkably interesting course of papers which are to be read next week at a Conference at the Health Exhibition under the auspices of the Royal Institute of British Architects, on the 10th, 11th, and 12th of the month (Thursday to Saturday next week). On each day there will be two short papers and a discussion, commencing at 2 p.m., and a further paper and discussion commencing at 4 p.m. The names of the presidents and the readers of the papers include, as will be seen from our list, some of the most eminent and able of the members who take an active part in the proceedings of the Institute. The subjects to be treated of include sanitary arrangement of houses past and present, drainage, impermeable construction of roofs and walls, collection and storage of water, &c. We hope there will be a good attendance both of professional and non-professional hearers, who will certainly learn something of value from the papers and discussions.

THE SUAKIM-BERBER RAILWAY.

IT is difficult to reconcile the conflicting statements put forward in regard to this proposed railway. Early last week it was announced in the House of Commons that no decision had yet been arrived at as to its construction, while a few days after it was said that the first ship-load of railway plant for Suakim had sailed from Woolwich. While the matter remains thus avowedly unsettled it may be useful to reconsider the expediency of selecting this particular route even for the purpose for which it is ostensibly to be undertaken. The expressed intention seems undoubtedly to be the construction of a purely military line for a temporary purpose, and without any ulterior prospect of allowing it to become a permanent line of communication suitable for either strategic or commercial purposes. It has been described as a light narrow-gauge railway provided with correspondingly light rolling-stock and engines, while its construction is to be entrusted to men of the Royal Engineers, supervising whatever native labourers can be found or transported to the locality, and it is anticipated that the whole will be finished within six weeks, or at a rate of four miles per day. In face of the physical difficulties to be encountered in regard to climate, want of water, sparseness of population, and hostility of the tribes through whose territory much of the line must pass, the expectation of such a speedy rate of construction appears to be somewhat sanguine. But assuming that all possible contingencies have been thoroughly considered, and effectually provided against, it is still open to doubt whether, after all, the route from Suakim to Berber is the best that could be selected for even the immediate object in view, that of facilitating the transport of an expeditionary force for the relief of Khartoum. Leaving aside, however, the military aspect of the question as not within the province of the *Builder* to discuss, the possibility, if not the certainty of the construction of a trade route with the Soudan becoming an absolute necessity, ought to have an important bearing in the selection of a line of communication which probably will involve an expenditure of two millions of the public money. Commercial requirements must in the end override political interests, and an interchange of mercantile operations, following a development of its resources, will be better calculated to effect the desired end of pacification and to consolidate the future government of the Soudan, than a maintenance of military demonstrations after the present disturbances have been quelled. If this view be correct, then the country to be benefited by the outlay, and on whom its burden will ultimately fall, being Egypt, that route which will most effectually assist the transport of its produce and develop its trade should unquestionably be preferred. It can scarcely be gainsaid that the valley of the Nile is the route which the trade will take. Produce from the Soudan and territories through which the White and Blue Nile run is now carried on these rivers to Khartoum and Berber, whence, if there must needs be a transhipment, it should at all events take the direction of Korosko rather than Suakim. The length of land carriage in either case is the same, but the route to Suakim lies through utterly unproductive country, whereas either terminus of the Korosko line abutting on the Nile would be useful for its entire valley, and all down-produce shipped at Korosko would be carried without breaking bulk, either to the warehouses in Alexandria, or direct to the ships' sides in the harbour. All the important towns between Cairo and Korosko would then be opened to trade with the Upper Soudan, Kordofan, Darfour, and the countries bordering the great lakes; but they would derive no benefit whatever from the Berber-Suakim line. The mere fact, too, of access to the splendid harbour of Alexandria, with its temperate climate, ought, in itself, to be sufficient to decide the question, for before Suakim could be converted into a useful harbour, a very large outlay would be necessary; and even if practicable at a moderate cost, its excessively trying climate, unendurable for several months of the year, renders it unfit as a place of permanent habitation for Europeans.

As, notwithstanding all existing obstacles and argument to the contrary, the Nile must and will remain the great highway from the interior to the coast, just as the great rivers in India and America still are, in spite of all the railways which have been, or ever will be, constructed, the attention of all those concerned in the welfare of Egypt should be directed to removing or overcoming the existing impediments to its effective navigation.

Pending the carrying out of works for that purpose, nothing could better serve intermediately as an auxiliary than a railway from Korosko to Berber, unless it be a temporary line carried along the river as far as "old Dongola," and thence across to Khartoum or Berber, distant 180 to 200 miles respectively. One advantage of the parallel line would be to facilitate the construction of the works for overcoming the present obstacles between the first rapid at Assuan, and the last between Shendy and Khartoum, while it would meanwhile carry not only the traffic arriving at the latter place for the coast, but also the produce of the country between Khartoum and Assuan. If, therefore, a temporary railway has under any circumstances to be constructed for military purposes, and the advantage of being in close proximity to not only water but to a tract of country from which inexhaustible supplies could be drawn will not be questioned, ought not the likelihood of its being ultimately required for commercial purposes to aid in determining its direction? There can be no question but that, if it is to be undertaken in the interests of Egypt alone, the Government of that country would pronounce in favour of the line which would serve as a trade route after it had fulfilled its military purposes. If Egypt is unable to pay the cost of construction, there would probably be little difficulty in getting a syndicate of capitalists in this country to take it over and work it. It would be well, therefore, that whatever route be selected, our Government should bear in mind the important fact that however useful and necessary their proposed railway may be for military operations, it will be still more useful afterwards for commercial purposes, and that it should therefore be so constructed to meet that end as far as is consistent with its primary object.

A FRENCH ARCHITECT ON THE COMPETITION QUESTION.

THE following is a part of the paper on Competitions, read by M. Paul Wallon at the recent Congress of French architects. Some of his remarks will be found suggestive by our readers:—

"Having given a brief summary of some long and serious disquisitions, we have now before us the views, many times expressed, on the subject of public competitions.

After this enumeration of the principal items in the grand total what, in my turn, shall I say?

People have spoken to you of resolutions, of decrees even, to obtain for the future a uniform regulation of competitions over the whole of France. Well, gentlemen, I venture to say, in regard to this official regulation of public competitions, these resolutions and decrees, and so on, I do not believe in them and do not wish to see them at all.

Every one must be master in his own house, whether an administration, a commune, or a constituted society, and I cannot imagine a Minister or a President of the Republic consenting to intervene between competitors and organisers in a competition.

It is by persuasion and appeal to the public that one must work, by interesting them in our cause and showing them that it is at the same time their own and that it is by advising them as well as in defending ourselves that we hope to obtain better results.

Declarations of principles have had their day, official inquiries and communications have done their work. Leave on one side, if you please, vague forms, Platonic views, and mere theory, and enter more strictly on the real question; put our finger on the sore, and, by example, counsel, and energetic action when needed, let us write day by day the history of public competition up to the point when no scandal can be possible, and when a corrupt municipality will recoil before public opinion.

Do not suppose that I deny the influence of statements of principles, or of those lengthy debates which we have just passed in review. I hear people say, 'Oh, the competition question. They have been discussing that backwards and forwards for years, and what comes of it all?' But all these discussions have not been useless, we may be sure. They have not resulted in '*arrêtes*' or '*décrets*,' certainly, but in something more important,—the formation of public opinion. The principle of competition is firmly established now, without any movement of great administrative machinery; it has entered into our life by the mere force of circumstances. I would even venture to say, and it will be my sole criticism against the institution, that there is a certain exaggerated desire for competition, on every hand. Every village wishes to play 'la grande ville,' and each little building is immediately thrown open to public competition. It is often an electoral question. The situation of the 'architecte de département' is not improved by it. For him, public competition is a source of perpetual danger, and, in case of failure, of humiliation before his fellow-townsmen, especially if the building in question should chance to be one of small importance, which he could, perhaps, have carried through far better than his unknown competitor, a stranger to the district, and simply either more fortunate or backed by stronger interest.

Now, it is of considerable importance that the position of 'architecte de département' should be sought after and occupied by those members of the profession who have spent their youth in studying at the École des Beaux Arts and under our greatest masters, and who are anxious to return to the provinces and to place their talent and knowledge at the service of their department. If the position is to be acceptable, it must be protected.

The 'architecte de département' must win his post by competition, and then it may fairly be conceded that he possesses the knowledge

necessary for the construction of schools, town-halls, and other municipal buildings without having recourse to competition at all.

The present, gentlemen, is no longer a time when (as M. César Daly wrote in 1861) the number of public competitions may be reckoned by that of the reigning dynasties in France; on the contrary, we may be said to suffer from a surfeit of them.

It is true, and the fact is to be deplored, that great public institutions still escape the salutary impulse given by competition; but this is an exception which will become more and more rare as time goes on. The question for us is not now whether competition will prevail, but by what guarantees it can be protected from injustice.

The morality of public competition,—that is the gist of the whole subject. I must allow at the outset that the phrase has been greatly abused. Every decision must create some malcontents, and the anathemas and accusations hurled at the judges by those against whom the decision has gone are often not merely exaggerated, but altogether unjust. It is but human to cherish illusions with respect to a work that one has begotten, nourished, and caressed through long months of application, and the rude awakening of an adverse judgment is often very hard upon this paternal fondness.

Nevertheless, instances of injustice do not seldom occur, and in accordance with the plan I have laid down for myself in this address, I will now venture to draw your attention to some that have come under my own observation."

M. Wallon then proceeded to narrate, with considerable irony, and amid signs of approbation from his hearers, the particulars of a somewhat recent scandal *à propos* of the election of an "architecte de département," and the curious fact, to say the least of it, of an architect who, on applying at the Mairie for the particulars of a certain building put up for competition, received instead an offer of collaboration, *not gratuitous, but obligatory*, from an "agent-voyer" (trustee of roads), who, upon this condition, promised his powerful interest to gain acceptance of the candidate's designs. M. Wallon also reminded his hearers of the open competition in 1880 for the construction of a police barracks at Oran; and, on the other hand, of the case in which, first the Conseil de Préfecture of the department, and then the Conseil d'État, condemned the town of Charleville (Ardennes) to pay the competitor whose designs for the construction of a college and library had been classed first, but not chosen for erection, his fees at a deduction of five per cent. from a certain sum for the cost of superintendence.

A similar decision was given in 1883 on the occasion of the construction of a group of school buildings at Puteaux (Seine).

M. Wallon continued, "It must not be imagined that similar abuses accompany competitions for such buildings as the Opera, or the Hôtel de Ville; the judges in such cases are men of the nicest conscience, of the most absolute impartiality, and the competitors find themselves face to face with a public opinion which it would be dangerous to displease." M. Wallon then drew attention to some erroneous ideas on the subject of public competitions, and discussed those recently set forth in a pamphlet by M. Charles Morin, architect of the department of the Bas-Rhin and of the town of Strasbourg before the German invasion; he amused his hearers by two anecdotes; one of a country mayor who mistook a Louis XVI. design for a toilet-table, all over Cupids and nymphs, for a church altar, and another of a "Conseiller Général" who took a tracing of some drainage tiles on a plan of a basement for the elevation of a clock-tower.

Drawing attention to what he believed himself entitled to demand and to obtain, M. Wallon continued:—

"Gentlemen, the State has far too many subjects in hand, far too many general interests to defend, to be able to occupy itself with a question so special, so variable, so difficult to formulate as that which we are considering. One may almost say that for every fresh competition there is a fresh way of organising its conditions, either in the details of the programme or in the composition of the jury. Do you intend to appeal to the Government on every occasion of difference? Who will blame it for turning a deaf ear to your appeal? If you have a grievance, there are the courts of law; we have just seen that they are not appealed to in vain. But, you will say, it is not every one who can engage in a law-suit, a hundred objections of time, of expense, &c., may arise to prevent it. During next Friday's session, gentlemen, you will have an opportunity of listening to a remarkable report, drawn up by M. Hermant, in the name of a special Committee, assisted by the Judicial Council of the Society, for the creation, under the auspices of the Central Society of Architects, of a mutual defence fund in cases of liability. The proposition emanates from the International Congress held at Nice at the beginning of this year.

Does not the question of public competition naturally fall within this scheme? By this means we can provide for our own defence, and for the repression of abuses and illegal proceedings.

Together with this federation for defence you must form a centre for information and advice. Here, again, it seems to me the *rôle* of the Société Centrale is pointed out.

It must be made known to all municipalities, public bodies, and committees that competitions will not be undertaken under certain inadmissible conditions; they must be convinced that these conditions will deprive them of the assistance of many architects of merit, of every architect who is desirous not to have his reputation placed in incapable hands. Those who are organising competitions must themselves come to us frankly, and say, We have full confidence in your powers, in your good sense, in your independence, and in your justice: give us your advice. Here is our programme in its main features; we rely absolutely on you to settle its details, to appoint the jury, to award the premiums. All our decisions accepted beforehand, we shall only appear to put them into execution. Do you believe, gentlemen, that any society, whatever it might be, consulted in this way, would not consider itself bound in honour to do its duty, and nothing but its duty? Do you think that a public authority could place its interests in safer hands than these?

And do not imagine that I am over-credulous or over-bold in speaking thus! Public authorities will be found only too ready to receive advice by which they will be the first to profit."

Here followed two instances that we shall content ourselves with quoting on the authority of M. Paul Wallon: one, of the good influences exerted in 1877 by the "Conseil Général des Bâtiments Civils," with regard to the open competition for the construction of an Hôtel de Ville at Rodez, and the other the influence exerted recently by the Société régionale of the architects of Northern France with regard to the competition for the construction of the Palais des Beaux Arts at Lille.

"Well, gentlemen," continued M. Wallon, "let all provincial societies imitate upon occasion their valiant sisters of the North. Let the central Society of Architects in Paris, in accordance with its principles of joint responsibility and co-operative union, create in its midst a centre of information, of publicity, of defence. Let there be a permanent, renewable Commission, bound to follow every phase of the question, to give every information, to receive all protests, and to refer all cases of interest to the members of the Mutual Defence Committee of the Society.

This protective province of the Society has already been recognised on more than one occasion under the direction of its president, Victor Baltard. A letter was written to the Mayor of Bagnères de Luchon on the subject of the open competition for the erection of a Casino in that town; and another to the Prefect of the Department of the Morbihan on the competition for the post of architect to the department.

I should like to see this assistance of the Central Society continued and extended; its wide reputation, its well-deserved influence would enable it to repair many errors, and to render great service to the general good, more especially in this question of public competition."

After further arguments, winding up with a moving appeal to national feeling, M. Wallon concluded, amid general applause, in these words:—

"Gentlemen! the discussion in which you are now to take part should be made known to all, to administrative bodies, to the public in general, as one that has a higher aim than the interests of any individual, of any school, of any corporation; its aim is the triumph of the artistic pre-eminence of France, the greatness of our nation!"

GEOLOGY AT THE HEALTH EXHIBITION.

ON Saturday, the 28th June, several members of the Geologists' Association, with their president, Dr. Hicks, F.G.S., &c., and secretary, Dr. Foulerton, F.G.S., visited the International Health Exhibition, for the purpose of seeing the various objects relating to their especial study. They were met in the Water Companies' Pavilion, at 4 p.m., by Colonel Sir Francis Bolton, C.E., Water Examiner to the Local Government Board, who conducted the party round the Pavilion, outer corridor, and the outside annexe, pointing out and explaining many of the principal exhibits. Amongst these were noticed the modes of filtering the water obtained from rivers in the vicinity of London, for which purpose glass cases have been erected showing in descending order:—1, Very fine sand; 2, coarser sand; 3, pea grit; 4, small sub-angular flints; and 5, larger flints. When water is poured on the top of such a filter as this, it percolates through, leaving the impurities behind on the uppermost layer of sand, whilst a pipe inserted in the lowest stratum carries off the filtered water.

In the outer corridor, to the left of the main entrance to the pavilion, is a unique exhibit, being a case lent by the Aqueous Works and Diamond Rock-boring Company, Limited, of London, containing a collection of cores of different strata, obtained in artesian and other borings by the diamond drill. In the following, which were particularly observed, the geological formation is mentioned, giving the depth at which the specimen was procured and the locality of the bore-hole. Chalk marl, 780 ft., Meux's Brewery, Tottenham Court-road; upper greensand, 860 ft., Albion Brewery, London; upper greensand, 610 ft., New River Company's boring at Ware; new red sandstone, 550 ft., from bore-hole for salt at Middlesbrough.

Other cores in the corridor are, gault, with impressions of pecten, ammonites, and pieces of lignite, 966 ft., Turnford, Herts; three examples from Devonian, 993 ft., 985 ft., and 1,000 ft. respectively, Turnford. In the core from 985 ft., spirifer, with other fossils, were seen. Upper greensand, 585 ft., Ware; two specimens of Wenlock shale, 800 ft. and 827 ft. respectively, Ware. Borings for water and other economics in the south-east of England show that a ridge or chain of Palæozoic rocks runs under London to the Continent. These borings are of considerable interest, both commercially and scientifically, for they indicate to a certain extent the position of building-stones, &c., which, it might be added, are too deep-seated to be profitably worked in the London area. At Messrs. Meux's brewery, at 1,064 ft., Devonian purple and green shales were met with. At Crossness, new boring, after passing through river drift, 39 ft.; Woolwich beds, 47 ft.; Thanet sand, 51 ft.; chalk, 631 ft.; upper greensand, 65 ft.; and Gault, 170 ft. Red sandstones and marls are met with, which may probably be of Triassic age. At Burford, Oxon, the boring shows:—Surface blue clay, 38 ft.; lower oolites, 110 ft.; lias, 598 ft.; rhaetic, 10 ft.; new red marls, 291 ft.; red sandstone, 137 ft.; coal measures, 225 ft. In the Carboniferous beds a coal seam of some thickness was passed through. A boring at Richmond, Surrey, recently described by Prof. Judd, proved the presence of oolites, and at the base of the hole red-rocks occurred which he thinks might be of Poikolitic age. The celebrated sub-Wealden boring at Netherfield, near Battle, clearly demonstrated that Jurassic rocks are of great thickness in that region, as nearly 2,000 ft. of them were bored through, and Palæozoic rocks were not reached. In this experiment valuable beds of gypsum were found which have since been turned to commercial advantage.

The outer corridor also contains many boring tools. There is a diamond drill boring-crown, 22 in. in diameter, showing five diamonds ready for use. The rough black diamond or carbonado, which is a peculiar form of carbon, is used for this purpose. It was discovered in the diamond gravels of Brazil in 1842, and appears to furnish a transition from the ordinary diamond to graphite. A diamond-drill core-extractor, used for breaking off and raising the cores, and a hand iron chisel, are also exhibited.

In the outside annexe are large mains, from 13 in. to 48 in., used by the water companies, with water meters and hydrants. Examples of stone, wooden and concrete pipes, of olden times, were particularly noticed, side by side with iron mains of modern times.

At this point the President, Dr. Hicks, thanked Sir Francis Bolton for the great trouble and pains he had taken during the afternoon in explaining the various objects to the members of the Association, and the party then proceeded to the Belgian Court under the direction of Mr. C. E. De Rance, Assoc. Inst. C.E., F.G.S., of H.M. Geological Survey of England and Wales.

There, various rock specimens, maps, and charts are exhibited, to show the manner in which geology and geography are taught in the elementary Belgian schools.

The following are amongst the principal objects which claimed attention:—Tin, which is almost exclusively obtained from Cassiterite, or tin-stone, a peroxide of tin containing nearly 80 per cent. of metal; antimonite, a tersulphide of antimony; a fine collection of calamine,—carbonate of zinc,—from the celebrated Vieille Montagne, or Altenberg deposits. These mines are situate in the Belgian, Prussian, and neutral territories, between the towns of Aix-la-Chapelle and Verviers. The calamine there has been worked since 1435 as an earth to make brass; but it was not until the beginning of the present century that it was found to contain any metal. Zinc-blende or sulphide of zinc. Galena,—sulphide of lead,—a most important ore, which usually contains various other metals, and it is probable that neither silver nor gold is ever absent from galena. Iron pyrites,—a bisulphide of iron,—is not so much a source of iron as of sulphur. Limonite or brown iron ore. Quartz crystals, chalcedony, agate, melaphyre, &c. Pebbles, and bottles containing sand, such as quartzose glauconitic sand, &c.

Amongst the rock specimens may be mentioned porphyries, granites, anthracites, ordinary bituminous coals, lignites, peats, limestones, sandstones, clays, shales, a series of slates, marbles of various descriptions, Cambrian schists, &c.

Calamites, lepidodendron, sigillaria, neuropteris, and pecopteris are some of the fossil plants from the coal-measure shales, and productus, atrypa, belemnites, lima, pecten, sharks' teeth (lamna, &c.) are examples of the very few other fossils exhibited.

It is noteworthy that in many instances in the case of metals the raw material was placed with the manufactured article, and the name of the specimen, the locality whence it was obtained, with its "usage," were written on small labels, attached to the majority of examples in cases.

Many maps are seen on the wall, on some of which the contour of the mountains, abysses of the sea, with ocean currents, are beautifully shown.

Mr. De Rance gave a short account of the Belgian coal-measures.

The party then adjourned to the fountain display, and finally broke up in the grounds.

MASON & SWANN'S AIR-HEATING APPARATUS.

AN improved air-heating apparatus for warming buildings is being introduced by Messrs. George Swann & Co., of Portobello-road, North Kensington. The apparatus (which is the subject of Patent No. 3,846 of the present year, 1884) appears to be well adapted for warming churches and other public buildings with economy and without the unpleasant sensation of the air having been burned, which is but too often apparent where hot-air apparatus is used. Messrs. Swann & Co. claim for their apparatus that it supplies *fresh* hot air; that it presents greater heating surface with less consumption of fuel and attention; that a hot-water apparatus can be fixed and worked from the one fire of the apparatus for warming any building adjoining, or for supplying hot water to baths, lavatories, &c.; and that it is simple in construction, having few flues, these being ascending and easy of access. The furnace-chamber is constructed of fire-lumps and is closely embraced at the top and two sides by series of inverted U-shaped air-heating pipes, which serve to hold the fire-lumps together. These pipes (B, B¹) can be made square in section as well as circular (the method shown in the engravings). We quote further description from the complete specification:—

Figure 1 is a transverse section of the apparatus. Figure 2 is a horizontal section of the same. The furnace-chamber A is constructed of fire-lumps *a*, and is closely embraced at the top and two sides by series of air-heating pipes, B, which serve to hold the fire-lumps together. These pipes are each composed of two vertical pipes B at either side of the furnace-chamber, united by a transverse pipe B¹. The vertical pipes B rise from chambers or passages C below, with which they communicate for the admission of air to the air-heating pipes B, the entrance to said chambers being at C¹ at the opposite end of the apparatus to that at which the furnace-chamber is situate. The furnace-chamber A is provided with a suitable grate, and communicates by a flue A¹ with a series of large horizontal flues D D¹ D² at the upper part of the apparatus immediately above the horizontal or transverse portions of the air-heating pipes B, the products of combustion passing through these flues D D¹ D² successively in the order named on their way to the chimney. For this purpose the flue A¹ leads into the rear end of the flue D which communicates by a chamber *e* at the front end with the middle flue D¹, which communicates by a similar chamber at the rear end with flue D², which communicates at the front end with the chimney.

A partition in chamber *e* prevents communication between flues D¹ and D² at their front end. The air-heating pipes B open out at B² immediately beneath the flues D, D¹, D², and they are placed closely together side by side, and to allow for expansion and contraction, their adjacent sides are fitted together by tongue and groove joints formed in ribs *b* cast on the sides of the pipes, and the whole series of pipes are tied together by tie-bolts b^1, passing through flanges b^2 cast on the outer sides of the pipes.

The horizontal flues D, D¹, D², are constructed in short sections, tongue and groove-jointed together at *d*, and cast with flanges d^1, through which tie-bolts d^2 pass from end to end to hold the sections together. By this sectional construction of the air-heating pipes B and flues D, the furnace and apparatus may be readily constructed of any required dimensions and air-heating capacity by employing a greater or less number of the said sections.

The apparatus is enclosed between front and back settings of brickwork or iron F, which leave the pipes B and flues D exposed to permit the free radiation of heat. The apparatus is provided at one end with a furnace front, having fire-doors and cleaning out doors.

The air to be heated enters the air-flues C at C¹, and rises in the series of air-heating pipes B, wherein it is heated by conduction and radiation from the walls of the furnace chamber, and is brought out under the horizontal flues D, D¹, D², where it is still further heated by radiation therefrom.

It will be observed that the air to be warmed is kept from contact with highly-heated surfaces of iron.

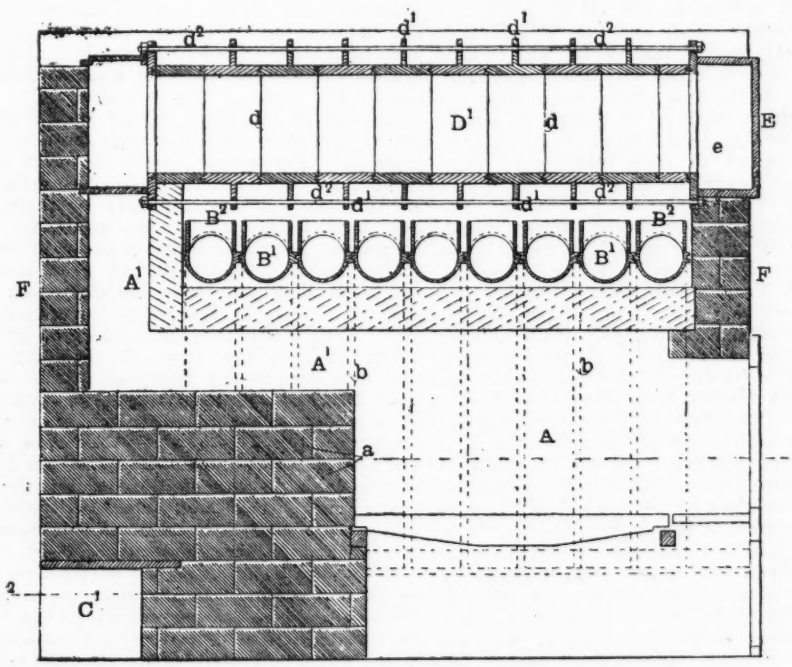


FIG. 2.

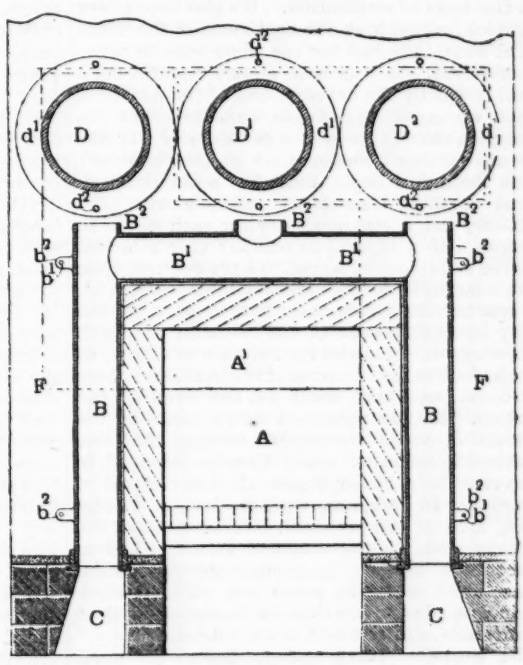


FIG. 1.

Mason & Swann's Fresh Hot-Air Apparatus.

ART-EDUCATION IN BELGIUM.

A SERIES of two conferences on primary education in Belgium was held at the International Health Exhibition, on June 27th and 28th, under the presidency of Lord Reay, chairman of the Educational Committee of the Exhibition. The first was given by M. Sluys, Director of the Normal School at Brussels, on the subject of "The Reform of School Methods," introduced into Belgium in 1879 by M. Germain, the Director-General of Education.

At the second of these Conferences (both of which were held in the Lecture-hall of the Central Institution of the City and Guilds of London) a lecture was delivered by M. de Taeye, Director of the Academy of Fine Arts of Louvain, his subject being "Artistic Teaching in Belgium and its Application to Industry." Among those present or taking part in the proceedings were Sir P. Cunliffe Owen, M. Couvreur, ex-vice-president of the Belgian Chamber of Representatives, M. Lenders (Belgian Consul), Mr. Ablett, and other English and foreign educationists.

M. de Taeye, who spoke in French, commenced his lecture by expressing his regret that he could not have at his side the collection of teaching exhibits in the Belgian Section of the Exhibition, for by reference to the various objects it contained it would have been much more easy to illustrate his lecture. The subject of art-teaching was excessively subtle, but it was also of the greatest importance for the workman,—the population *ouvrière*. The education of the artistic sense was not only a necessity for the due development of a pupil's powers, but was an important element in the wealth of nations. To conceive an idea was nothing, but to put it into practice,—there was the difficulty. Industry had been long travelling in a path absolutely false. All countries taking their cue from England,—especially two leading industrial nations of Europe,—had followed England in the pursuit of that

which was cheap. A man of profound perspicacity was the first to perceive the falsity of the situation. It was a prince of England (the late Prince Consort). He had a true inspiration. He created the Great Universal Exhibition of 1851, which brought all the different nations of the earth together Then it was revealed to the world for the first time that cheapness was not the most important thing. England astonished the nations by her extraordinary wealth of machinery and tools, and another country impressed every beholder with the fine æsthetic sense of the beautiful which pervaded her productions,—it was France. There followed Persia, Japan, and China with their products, which were the admiration of all. It was before these that the crowds gathered and stopped to gaze. Why? It was the artistic sentiment, the feeling of the beautiful, governing all other sentiments. It was determined that the unfortunate direction which industrial art had taken should be abandoned, and the leader in this movement was again Prince Albert. He was followed by others. A report of the Exhibition held in England in 1851 was drawn up by Count Laborde, who enunciated a truer sentiment,—"L'art!" said he, "c'est la plus puissante machine de l'industrie." ("Art is the most powerful engine of industry.") The true path was now entered, for the love of the beautiful was natural to man. It existed among some semi-civilised races perhaps in a purer form than among the nations that stand at the head of civilisation. We saw the wilder peoples imbued with the sentiment of the beautiful when they had not the wherewith to cover themselves. It was now clearly apprehended that it was by the development of the beautiful that we must emancipate ourselves, but the question came, How was it to be done? It was to answer that question that he (the lecturer) was there that day. None but a few rich persons occupied themselves seriously with the matter, and it was necessary for each seeker to search within himself to find the true solution. Three countries appeared to have entered upon the search, following parallel lines. England, it was natural to remember in that place, led the way by the creation of the Museum of South Kensington,—a model for Belgium to follow, as it was for France. There art found a shelter where it could popularise itself to the eyes of the nation. France, possessed with a sense of the beautiful, sought further to develop that fine æsthetic sentiment which already belonged to the race in a richer degree than to the rest of Europe. In Belgium, with its love of family life, love of the practical, love of method, the efforts made in the common direction had to encounter almost insurmountable obstacles. The chief obstacle arose out of a vicious principle of teaching then in favour,—a method detestable,—he referred to the "drawing copy." The wretched thing was put before the pupil with the command, "reproduce what you see before you." The copy was, so to speak, thrown at the pupil's nose. Guillaume, in Belgium, proclaimed the doctrine that all drawing should start from a basis of science, but not being a very practical man, he did not show how it was to be done. Under what form was it to be founded upon science? There were two distinct kinds of drawing,—picture-drawings and (what were called in English) "designs." The real question was, under what form was the teaching of drawing to be put within the reach of all in our primary schools? The denunciation of the evil of copying was set forth, and an answer to this question at the same time suggested, by Herr Von Müller, Minister of Public Instruction in Prussia,—a man of real erudition,—in a letter of instructions on the organisation of professional schools. "The teaching of drawing," says the Minister, "must remain within school limits. Its purpose is not to produce artists, but much rather to exercise the pupils in the elementary practice of art; to enable them to acquire the knowledge of form, the rapidity of a sure eye, accuracy of measure, and firmness and lightness of hand. It is of less import that what is drawn should be picturesque than that it should be exact." And the Minister adds impressively "The method must be organised in such a manner that every capable teacher may be in a position to successfully teach, according to it, the elements of drawing; and that from it should be rejected every copy lacking in idea, and above all those mechanically executed productions of images which are so well known to everybody." Herr Hellart, a famous Austrian educationist,—a veritable Frœbel in his way,—also demanded that an immediate remedy should be found to overcome the same difficulty. The remedy consisted in the rejection of the "copy" and the flat outline from the early lessons, and the substitution of objects from nature or forms in relief. This substitution brought drawing at once into the category of subjects to be taught in the primary schools by the logical process of developing the intelligence. It only remained to put it into the hands of the teachers, but the question then arose at what age the child's instruction in drawing should be commenced. M. Couvreur was of opinion that it should commence at the same period as reading and writing. In that way could best be secured the development of the hand. Thus the hand would be rendered supple and the eye sure. It was thus that the famous Horace Vernet, trained by an intelligent father, became able to answer more readily with his pencil than his tongue. When asked to tell the name of a person he had seen, young Vernet, to save himself the trouble of remembering names, would take a piece of paper, and, after making a few rapid lines, would hold it up, and say, "That is the man." The lecturer then described the programme in detail, which had been incorporated into the reformed system of primary education in Belgium in force since 1879. The instruction was given in four stages,—I. (the first year's course), for children aged from six to seven; II. (second year's course), for children of seven, eight, and nine; III. (third year), for children of eight, nine, and ten; IV. (fourth year), for children of ten, eleven, and twelve years, and in some cases to thirteen and fourteen years. In the first year's course, after the child's intuitive notions in regard to points had been developed by dots placed in all positions with regard to each other, they were combined in denser and denser formations to develop the notion of intensity of tones. The intuitive notions of colour were then exercised, with a view to discover as early as possible the existence of "Daltonism." Before proceeding to straight lines, which were regarded by M. de Taeye as far from simple things, when combined in certain ways, certain common objects in solid and natural forms were treated, the instruction forming in all cases the foundation on which further instruction at each step was based. The first year's course finished with the combinations of straight lines and drawing from memory. All the exercises at this stage were done on paper ruled in squares, or on slates or black boards marked in the same way. They were, of course, freehand drawings. The second year's course commenced with the study of curved and mixed lines, followed by exercises in shading and colours, the complementary principle in colours being now introduced. Gothic letters and figures, and the drawing of common objects from nature, followed, lines interlaced, and the application of lines to ornament and drawing from memory concluding the second year's course. The third year's course was directed particularly to quickening the eye of the pupil, and to developing firmness of hand; geometrical figures were now introduced, but no instruments were used, and the exercise-paper was plain, except that on the sides a scale in divisions of the mètre was figured. In the fourth year, projection and perspective were treated, geometric drawing with instruments was taught, and in freehand drawing natural objects were selected as models, offering all possible complexities of form. The exercise-paper was quite plain, no help of any kind being supposed to be necessary. M. de Taeye concluded his lecture with a few general observations, couched in earnest and eloquent language. The Belgian system of teaching drawing, as well as other subjects, was founded upon the maxim of Herbert Spencer, "The intuition to learn ought to precede the instruction." The details of the system resembled the German models from which they were adopted, and it might be hoped that they would be found equally worthy. Their youths on leaving school were fitted for noble toil, and, without indulging in the language of exaggeration, he declared that to give the workman a knowledge of graphic form was of greater necessity than to teach him to read. We were very far from having assimilated our conditions as regarded artistic knowledge with those which existed in the Middle Ages. All our true workmen were in the past, but we were at last ready to follow in their footsteps. What would be the result? Naturally the workman would have acquired a correct taste, and insensibly they would be able to draw him more and more out of the workman to turn him into the artist. Each individual would receive the instruction which best befitted him for his work, and the sentiment of the beautiful would necessarily generate the sentiment of morality, and we should, therefore, possess in him an element of moral, material, and intellectual progress.

Sir P. Cunliffe Owen (speaking in French) proposed a vote of thanks to M. de Taeye for what he described as "the splendid, the admirable, lecture," they had just listened to. With regard to the question of "art applied to industry," it was one which had been agitated in many other countries, and it concerned every country, but in none had it been more persistently considered than in Belgium. It was very remarkable to see a young country pursuing with such ardour a subject so large, and it had astonished many. But Belgium wanted something more than to secure for herself the advantage of a good system; she was willing to show everything to those who might be adverse. In 1879, drawing became a compulsory part of the primary education in Belgium. That step set a great example which would be followed by all countries. But to what purpose would they have taught drawing if they had no models to put before the workman? In the South Kensington Museum here we had a million visitors annually, and the loan collections distributed from the Museum in different parts of the country attracted from two millions and a half to three millions of visitors in the provinces. It was in that direction he wished to see Belgium, and even France, rise to the level of the occasion. But the possession of a museum of art models would not be sufficient unless it was open in the evening. The people would say that such institutions were not for them. They would say the museums were not made for them, but that they (the people) were made for the museums. They would not succeed in propagating science unless they had good models, and until they put those models within the reach of the people. The Belgians were a social race. They could always find plenty of amusement. If they saw three Belgians together they were sure to be a merry company. They must direct this characteristic to the advantage of the people. That was what he asked of them above all. The King of the Belgians, in 1873, and again in 1877, expressed to him his desire to establish a museum on the model of that of South Kensington. He expressed his conviction that a museum could not succeed if it were not open in the evenings.

Mr. Ablett, in seconding the proposition, said he did not quite agree with setting up a knowledge of form in primary schools as the most important matter. Other subjects had a claim to be studied before drawing. He quite agreed as to the necessity that for teaching drawing satisfactorily it should be done in a room specially adapted for the purpose.

Lord Reay said he had listened with much pleasure to M. de Taeye's admirable address. It was an excellent thing for Belgium to have organised such a method of teaching drawing. As M. Couvreur had pointed out, the improved methods in teaching drawing improved the chances of getting higher places for the children taught in their schools. While listening to the lecture it seemed to him that we were trying to find our way again after having lost it. It was not the dark Middle Ages that were dark, but the modern times, and it was re-assuring to find that we were trying to regain the light of the Middle Ages. The same thing appeared to be going on in all countries. He spoke not only of Holland, but of Germany, and those who would pay a visit to the exhibits from the school of Carlsruhe in the German section would see what the Germans were doing. The French were now importing from Germany certain classes of goods of which France had formerly almost the monopoly. That was a fact, and not simply an oratorical statement. He hoped the lecture would be published and sold in the Exhibition in order that it might address itself to a much larger audience than they could expect to get at these conferences. He thanked M. de Taeye and also M. Couvreur for the valuable assistance they had rendered in making the conference successful.

The vote of thanks was carried by acclamation, as was also a vote of thanks to Lord Reay and the Educational Committee, on the motion of M. Couvreur.

CAN THE NEW GOVERNMENT OFFICES BE DURABLE?

SIR,—This, at the present moment, is such an important question for Her Majesty's tax-paying subjects that I do not doubt its consideration, ere it is too late, will be generally welcome should you be able to grant a little space for it. It will not be the first time you have allowed me to urge it in your columns; but, as you are well aware, all innovations,—even the best,—require much reiteration before they are adopted.

When the late Dr. Ansted, some years ago, was delivering some Cantor lectures at the Society of Arts he remarked,—after lamenting the rapid decay of the public buildings of London, whether constructed of limestone or sandstone,—that quartz rock was the only material to be relied upon. It is true that he added the words, "too hard to be chiselled," which, at that time, was a fact, but is now no longer so. The ingenuity of our countrymen has overcome all difficulty in this respect, so that the hardest volcanic stones can be surfaced at the speed of a square foot in about five minutes, and as the patent has just lapsed, there are no royalty charges to pay. Hence a great step in economy. And burnishing, by which process alone the natural and characteristic beauty of porphyry, serpentine, and granite can be developed, is now so simple a matter that it may be done by boys.

In the face, then, of these facts,—the rapid decay of all freestone buildings, the absolute and proved durability in London of volcanic stone, and the facility and economy with which it can now be converted into useful building material,—is it too much to hope that the First Commissioner of Works and the architect of the above important national structure, whoever he may prove to be, may find it possible to abandon the use of the perishable freestones hitherto in favour,—for no better reason than that as they are so easily carved and moulded a building may be enriched with abundant meretricious ornamentation at little cost? Surely, Sir, we have had enough of this. A purer and simpler style, with better construction, would be a welcome innovation. A highly-ornamental façade of Bath or Portland stone may, of course, be the most beautiful product of architectural art; but, *cui bono*, if it fall to pieces, like the east front of Buckingham Palace, before the workmen depart, or be changed from white to nearly black by soot absorption, like the Royal Courts of Justice, before the contractor delivers up the keys?

There are good reasons for believing that it would be economical to make the change I venture to propose; for what can be more costly than to be compelled, as we are, to be constantly repairing the soft porous stone of our public buildings? Twenty years ago the elaborate sculptured exterior of our grandest national edifice, that was to last for ages, and the stone of which had been selected by a Royal Commission costing nearly 20,000*l.*, was showing signs of crumbling to dust. Since then it has been necessary for the Government to invest about 70,000*l.* sterling to provide a yearly sum of 2,500*l.* for the constant renovation of the stonework of the Houses of Parliament. At the present moment the façade of the Treasury is in the hands of the masons, at a cost of 8,000*l.* at least. Lambeth Palace has been restored at the earnest appeal of the late Archbishop. The Dean and Chapter of Westminster, the Ecclesiastical Commissioners, and the Government are now anxiously discussing the ways and means for a thorough restoration of the Abbey, the decayed, if not dangerous, condition of which has been fully reported upon by Mr. Pearson. This, although hundreds of thousands have been spent in restorations since Wren's time. At St. Paul's a column of one of the porticos gave way and has been replaced with new stone, and other repairs are much needed, but must wait for want of funds. The Travellers' Club in Pall Mall, and Buckingham Palace, are painted annually to preserve the stone.

But enough, Sir, of examples that might be multiplied indefinitely. I think it will be admitted that they sufficiently prove that building with freestone in London,—and this is entirely and emphatically a London or town question,—is a very costly proceeding indeed.

The materials I have referred to are mostly very common. As we pave our streets and form the edges of our footpaths with them it cannot be a very great step in advance to construct the fronts of our more important buildings with them.

Aberdeen may be called "a granite city." The inhabitants allow no meaner material to be used. It is true that it is upon the spot, and, therefore, comparatively cheap, but why, for Government work for which we all have to pay, should not an Admiralty transport be employed to reduce carriage? Nearly all the ancient churches of Cornwall and Brittany are of granite. It was the constant use of these enduring materials that has saved to our times all that conquerors have spared of the edifices of ancient Egypt, Greece, and Rome.

Of course, in constructing a modern building of granite and other volcanic materials neither an economical nor a beautiful result would be secured without an intelligent study of their nature and capabilities. Like precious stones, their beauty is only revealed by burnishing, but this process is just that which renders them supremely suitable in the fuliginous climate of London. The hard impenetrable surface is cleaned down by every shower. I have passed the Crimean monument, Westminster, frequently during past years, and I perceive no change whatever in its polished granite shaft,—no decay, no dirt. Not so the freestone canopy, which is black with absorbed soot and other defiling *débris*.

An experience of twenty years gives me great confidence in asserting that a building constructed with the simplicity of detail necessary to exhibit the natural beauty of these materials would entail little if any extra cost. There need be no elaborate mouldings or deeply-cut carvings. As we all know, some of the noblest structures of ancient times are strikingly simple in their details. Their architectural effect would be utterly ruined by increased richness. A few splays of larger or smaller size were all-sufficient for perfect work in those days. The old buildings of Burgundy show what excellent architectural effect may be obtained by simply applying two or more materials in masonic construction.

Working upon these lines, a careful comparative estimate by a well-known surveyor, prepared from detail drawings of the front of a bank,—one of richly carved Portland stone, the other of burnished granite, porphyry, and serpentine,—gives three per cent. only in favour of the former, which as we have seen would require much subsequent outlay in repairs, while the latter would entail none.

The too common use of polished granite in combination with dull freestone is, to my mind, an inartistic proceeding. As well put new cloth into an old garment. But I will here try to describe a new edifice. Comparatively small stones should be used, so that decoration may be almost entirely dependent upon construction. The bulk of the building should, I think, be of white, or nearly white, granite from Cheesewring, Gunnislake, Par, Okehampton, or Kemnay, with the lines of construction emphasised with dark grey Dalbeattie, green Poltesco serpentine, rose syenite from Mountsorrel, and black basalt from Clee Hill or Rowley Regis.

These colours are all of subdued character. Indeed, they are tints rather than colours. As none of the primaries exist, a gaudy effect would be impossible. Thus treated, the façades would require little additional ornament. A little mosaic of the choicest of the materials in spandrels, panels, and strings would probably satisfy the most refined taste.

A simpler treatment would be to have one colour only for the ornament on the white ground of the general surface, similar to the exterior of the duomo of Monreale in Sicily.

It would be departing from the simplicity of this proposal to hint at such a mosaic frieze as that to the exterior of the New Museum, Berlin.

I have said nothing of architectural style, because this is mainly a question of construction, and is more or less applicable to any style.

If such an edifice as I have ventured to suggest could be realised for the New Government Offices, it would not only be truly economical from its extraordinary durablity, characteristic of this scientific age, and, doubtless, of sufficient architectural beauty; but it would at once and for ever do away with the reproach of the foreigner that Englishmen,—practical Englishmen,—are unable to cope successfully with a practical difficulty,—the erection in London of a really durable building. Surely such a national benefit is well worthy of the administrative powers of the First Commissioner of Works.

H. TRAVIS.

INTERNATIONAL HEALTH EXHIBITION.

VENTILATING APPARATUS FOR DWELLINGS, WORKSHOPS, AND MINES.

IN the Western Gallery, along with various other mechanical appliances, are to be seen some ventilating apparatus, the exhibitors of each claiming some speciality in connexion therewith. With rival schools of ventilation, and claimants asserting priority of invention in regard to certain principles, it is difficult, perhaps, to steer a safe course; but we will endeavour to be just without being invidious in our criticisms. We must be candid at once in saying to all, or nearly all, the exhibitors of ventilating appliances, that though improvements in details are manifest, and though useful modifications have been introduced, ventilation, as a system, has not made such rapid progress within this century as many persons imagine. We will first describe a few of the appliances on view, and further on we will allude to what was accomplished long years ago, but which seems to be ignored by our rival schools of the present day. It may be possible that exhibitors, save an odd one or two, are not posted up in the history of modern ventilation, or are in ignorance of what was attempted and accomplished many years before they were born.

Messrs. R. W. Hale & Co., Chalton-street, N.W. (Stand 1,125), exhibit registered air-pump ventilators designed for the inlet of fresh air and the exhaustion of vitiated air. We are told that these are applicable to all classes of buildings, hospitals, schools, factories, ships, sewers, &c. The ventilator on this stand comprises a series of cones fixed at an angle of forty-five, divided by what are termed baffle-plates. The ventilator is not still in calm weather, but keeps in motion as if there was a stiff breeze, though not, perhaps, with such quick action. Down-blow is prevented by the arrangement of the baffle-plates. The inlet ventilator is constructed with a sleeve acting in telescope manner, to suit the thickness of any wall. The air, before it enters the room, has to traverse a conical tube, where the stream or current is converged to a focus. It then impinges on the air contained within a second cone, thus acting as a "cushion," so called. The current of air becomes broken up, as it were, and is then distributed through a perforated grating into the room "without impact and without draught." As far as we could test these ventilators and examine them by the light of experience in regard to similar appliances, we were favourably impressed by their construction. The exhibits include inlet chimney-breast and extraction ventilation. Chimneys have often been capped, but if the exhibitors' "chimney caps" do their work effectively from all points of the wind, they will indeed be a blessing to perplexed householders, who have more sad experience of draughts than pleasing ventilation. Messrs. Robert Boyle & Son, Holborn Viaduct and Glasgow (Stand 1,126), exhibit, among other appliances, patent air-pump ventilators, chimney-cowls, and soil-pipe ventilators. The well-manufactured appliances of this firm have been more than once described in these pages. We may briefly say the action of these ventilators is continuous, the hot vitiated air is extracted, the fresh air being admitted through louvre openings. The current is scarcely perceptible, and down-draught is prevented. It was well understood long since that hot air naturally ascends, being the lighter body, but some of our recent exhibitors, though apparently knowing this, allowed the current of cold air entering the room from above to force down again the foul air to be rebreathed, by not adapting their system to meet admitted wants. The chimney-cowl is composed of a cylinder set into, and in prolongation of, the brickwork of top of flue. This cylinder has a varying diameter according to different circumstances, being made to enlarge or swell into a large circular box formed of two truncated cones inversely joined, the aperture of the upper one being of a diameter equal to that of the cylinder. Surmounting this construction is another truncated cone held up a certain height from the lower structure by suitable uprights, and finally the whole is crested or crowned with a hollow conical cap, also supported a few inches higher by uprights. The action is as follows:—The smoke ascending the flue strikes before escaping from the inside of the top cap, then passes into the conical box, which is at once heated

by connexion, so that a comparative vacuum is formed there, sucking up and creating the desired continuous draught. Mr. B. B. Stirrat, Newcastle-on-Tyne (Stand 1,129), shows steam radiators, steam heating combined fresh-air warmer and ventilator, indirect steam-heating coil, return water feeder, and plans of buildings heated by steam. The radiators are simple in their action, taking the water from the coils and returning it without waste of heat. There is economy of fuel and ease in attendance. The appliances are applicable to breweries, sugar refineries, paper-mills, &c. Mr. James Howarth, Victoria Works, Farnworth, near Bolton, shows a large assortment of ventilators of all kinds, suitable for rooms, public buildings, and workshops. In point of manufacture the exhibits are good. The patent chimney-breast ventilator for ventilating rooms by means of the flue from the fireplace appears to be a very serviceable appliance. Mr. George Segrave, Wellington Buildings, Chelsea, S.W. (Stand 1,133), displays his hot wind generators for ventilating hospitals, houses, and heating the same, also for disinfecting, deodorising, flushing, and drying. Stewart's patent high-pressure blower, shown on this stand, for accomplishing the ventilating and drying process, is a differential blower, its action being derived from two blades, within a cylinder, revolving with varying velocities around a central shaft, concentric with the axis of cylinder. The velocity is controlled by the eccentric cross-head acting upon the crank arms outside the cylinder. The advantages are double-action, the charge of air (or other fluid) being delivered twice each revolution; there is no gearing, no valves, no dubbing composition needed, and finally the action is positive and in no way dependent on high speed. Driven in the opposite direction the outlet becomes the inlet port, and *vice versâ*, the action being reversible, applicable alike to exhausting and blowing. Messrs. J. L. Bacon & Co., Gloucester-place, N.W. (Stand 1,137), have on view several excellent exhibits in relation to heating and ventilating, but the chief of these we have recently described. It is needless to say that the manufacture is good, and, judged by present standards, the articles merit adoption from their suitability. The hot-water heating apparatus of this firm has met a public want, as is shown by the number of public buildings into which it has been introduced. Messrs. Hill & Hey, Halifax (Stand 1,168), present models of their patent Excelsior Syphon, or double-current ventilators, for buildings and workshops, &c., without other means of inlet, wall ventilators, and others for roofs, and dining, drawing, and bed rooms. The double-current ventilators are intended for outlet or exhaust, "enabling the arrangement of inlets below to be dispensed with." Fresh air is here stated to be brought in, and vitiated air extracted efficiently. An excellent induction mine and colliery exhaust ventilating fan is shown by Messrs. Henry Aland & Son, Commercial-road, E. (Stand 1,171). In fans generally the blade travels double the speed of the air, hence a great vacuum takes place behind the blades. Here, however, the vacuum is filled with air by openings in the side plates or cones of the revolving propeller. The intake of the fan is increased to nearly the diameter of the revolving impeller itself. The fan can be used for a large volume at low pressure or a restricted volume at high pressure. These ventilators are applicable to buildings and factories as well as to mines, and can be fixed in any position. We consider the triplicate mine and colliery exhausting fan a very efficient apparatus. The single and double geared hand ventilating fans are also very serviceable ventilating appliances. The first-named fans are made in sizes from 3 ft. to 12 ft. in diameter, the latter being of sufficient capacity for the largest coal-pit worked. The Blackman Air Propeller Ventilating Company, Fore-street, E.C. (Stand 1,173), display a number of their appreciated propellers. The special feature consists in the construction of the blades towards the periphery, so arranged to prevent the radial escape of the air, but causing a directly increased current over the large area created. The propeller is adapted for the removal of heated or foul air, or dust, and in drying processes.

If the reader keeps in mind some of the principles put forward in connexion with the ventilating systems and apparatus above described, and compares them with what we state presently, he may be inclined to say that in our grandfathers' days, or even previously, men knew something more of ventilation than we give them credit for. In the last quarter of the eighteenth century, M. Le Roy, member of the Royal Academy of Sciences, Paris, in his observations on the construction of hospitals, which were accompanied with plans, made some very pertinent suggestions on the subject of ventilation. The general construction of hospitals in his day was objectionable, because the majority of the wards did not admit of perfect ventilation, the air passing from one patient over another, as it does still in several of our British hospitals. M. Le Roy held that a large hospital should consist of distinct and separate buildings, each forming one ward, erected upon arches or columns, at a considerable height from the ground, and ranged at a distance from each other like the tents of an encampment. The ceiling or roof of each ward was directed to be formed with a number of spherical arches, according to its size, the crown of each arch being in the middle of the breadth of the ward, and opening into a funnel like a common chimney, which should be supplied with a vane [or cowl], so that it might be always open to leeward. In each floor, midway as to breadth, there was to be a row of holes at suitable distances from each other, to admit air from below, so constructed that the quantity of it might be regulated at pleasure. In consequence of this structure M. Le Roy says,—"There must be a constant change of air; for that which is in the lower part of the ward, being warmed by the patients and nurses and the necessary fires, will ascend, and in consequence of the spherical construction of the roof will be directed to the openings in it, and flow through them, while the holes in the floor will afford a constant supply of fresh air, which will move rapidly as it enters the room so low." Then follow directions for placing grates or stoves over the holes in the floor, for warming purposes, and other arrangements for quickening the circulation of the air. Verily some of the representatives of our rival schools of ventilation must have been filching the brains of dead men, or is it that congeniality of thought produces similarity of expression? Let us appeal to history again. Up to 1782, of 17,650 infants born alive in the Lying-in Hospital, Dublin, 2,940 had died within the first fortnight,—nearly every sixth child, or 17 in the 100. The disease was known then as the *black fits*, another form was known as the *white fits*,—forms of convulsions and wasting respectively. Dr. Clarke, the master of the hospital, came to the conclusion that the disease was owing to the following causes:—(1), Foul air; (2), neglect of keeping the children dry and clean; (3) the irregularity in the manner of living of their mothers, more especially in the abuse of spirituous liquors. The first cause appeared to be the principal one; for there was lack of proper ventilation in the hospital. To remedy the serious defect, Dr. Clarke carried out a number of alterations for the better ventilation of the hospital. Apertures of considerable size were made in the ceiling of each ward, which were after some trial changed for air-pipes of 6 in. diameter. Three holes, of 1 in. diameter, were bored in an oblique direction through each window-frame at the top. The upper part of the doors entering the gallery were also perforated with a large number of holes. By these means an easy inlet was given to the air through the wards at all times, and so executed as to put it out of the power of the nurses or patients to control. The beds were reduced in number in the large wards, and more cleanly and airy arrangements were made. The result of this simple method of ventilation a century ago was shown daily in the fits of the children becoming less frequent. By 1789, of 8,033 children born after the new system of ventilation was adopted, only 419 died, or a little over one in nineteen. See what ventilation did in the saving of human life even in days when men were scarcely credited with knowing anything practically about it. Our advance, after all, is not very great in the principle of ventilation or the science thereof, though it must be admitted our appliances have largely increased for admitting fresh air to our dwellings, workshops, and mines, and extracting the foul air therefrom. There is growing a manifest tendency in our midst to ignore the labours of our social and sanitary pioneers and reformers, which should be combated. Water, said the poet Pindar, is the best gift of Heaven, but what would it be in the absence of pure air in our workshops and dwellings?

HEALTH EXHIBITION LECTURES.

HEALTHY HOUSES.

ON the 24th ult. Mr. T. Pridgin Teale, F.R.C.S., delivered a lecture at the International Health Exhibition on "Healthy Houses."

Mr. F. S. Powell, in the absence of Captain Douglas Galton, C.B., through indisposition, presided, and in the course of his remarks observed that the lecturer held high rank in his profession, but his industry had not been confined to the duties of his profession, strictly so-called. He had given great attention to the application of science to the domestic arrangements of a home.

Mr. T. Pridgin Teale said that there were 24,000 medical men in the United Kingdom whose lives, abilities, and energies were devoted to the preservation of health and the cure of disease, and yet until the last few years there was scarcely a house in the kingdom which was not at times a source of illness, and there were very few householders who knew, or appeared to care, whether their houses were not manufactories of disease. When, some years ago, he expressed his conviction, in the course of a lecture he delivered before the Leeds Philosophical Society, that very few houses were safe to live in, he was looked upon as an enthusiast; but now such a statement would be looked upon as a truism, so great had been the progress in the diffusion of sanitary knowledge and in the identification of sanitary facts. Sir James Paget had lately spoken of the diminution of preventible diseases during the last ten years, and this progress had been more the result of greater knowledge of sanitary matters on the part of the public than of legislative interference. Much remained to be done, but a great deal could be effected by the carrying out of the sanitary laws we possessed. The basis of all true sanitary progress must be the spread of sanitary principles among the people. Every old house in the kingdom should have its sanitary arrangements revised on the principles adopted in recent years, and every new house could be made perfectly healthy, which would be done if those interested in its construction made themselves acquainted with improvements in sanitation. Proper arrangements were more simple and economical than faulty ones. The lecturer described the horrid state of the kitchen of his father's house when he, a little boy, saw the floor taken up in consequence of the place being overrun with rats, a foul drain running beneath the house. The scullery-sink was some distance from the outside of the house, and the contents of the sink went into an old-fashioned drain, which emitted a very foul smell. Perhaps the simplest and most universal of our sanitary arrangements was the sink, and if people knew what a sink really ought to be they would have made considerable progress in sanitary education. The sink carried away the refuse of a house, but as long as it was connected with drains carried under the house so long would there be risk of disease. A true sanitary maxim to be followed in building a house was to let no drain be under any part of it, to disconnect all waste-pipes and all overflow-pipes from the drain, and to place the soil-pipes outside the house and ventilate them. It was a great thing to get the refuse as quickly out of the house as possible. The principles he had just mentioned any one might make himself acquainted with and carry out. The lecturer referred to baths, lavatories, and closets generally in connexion with the principles he had laid down, insisting strongly on the importance of disconnecting the houses from the drains. He also alluded to the fact that some of the faults of construction of the houses were due to ignorance, while in other cases they were to be attributed to rascality. There was a very reprehensible practice of putting in "seconds" pipes,—the effect of which was to make faulty drains, merely because the builder found these "seconds" pipes cheaper than sound ones. The lecturer illustrated his meaning by reference to diagrams arranged on the walls. He was afraid there were thousands of houses which had untrapped sink-pipes passing into the drains. The lecturer proceeded to make some practical remarks in regard to the necessity of the isolation of the sick in the cases of infectious diseases, and dilated on the importance of keeping out dust and dirt from the larder. He also insisted on the necessity of a good water-supply, of good

ventilation, and on economy and cleanliness in the use of fuel, quoting the following passage from a leading article in the *Times*: "Sir Henry Acland took a very proper tone when he reminded the Conference of the necessity of economy and simplicity. Common sense would insist upon striking a rough balance of risks and cost. It was important, therefore, to keep down the cost whether in money or trouble, and Sir Henry Acland said it was astonishing how little was often required to make a house decent and safe without imposing on the owner or occupier costly things which it was difficult to procure, and complicated things which it was difficult to maintain."

A vote of thanks to the lecturer and the chairman terminated the proceedings.

ANGLO-SAXON FOOD AND DRESS.

THIS was the subject of a lecture delivered at the International Health Exhibition on the 27th ult., by Mr. J. Frederick Hodgetts.

The lecturer commenced by observing that he intended to bring before his audience a brief sketch of what was known in reference to the food, dress, and dwellings of their own proper ancestors. In dealing with questions having a social and historical bearing we were too often led by the absurd bias of writers to trace the origin of all that was great and good to what was foreign to ourselves and to our progress as a nation. Our true ancestors, from whom we derived everything English, were somehow shuffled off. The history of England, therefore, according to many authorities, commenced with the appearance of the foreign Conqueror, who was called erroneously the first king of England. One glowing writer began his history with another foreigner, the third William. The advent of the first William had been too much dwelt upon. The English never became Norman. The few hundred Normans, the self-styled rulers of this land, never affected the English language nor modes of thought, although eight centuries ago there were snobs who copied those in power and spoke French. But that died out. The Norman sounds had nothing in common with the English language. Professor Max Müller, of Oxford, had pointed out that language could not be mixed. Words might be introduced, but the true spirit of a language could not be affected by them. Our early ancestors came from Scandinavia in the fifth century, and they remained Pagans until Rome sent missionaries to these shores and converted them to Christianity. They never were conquered by Rome; they took her Christianity, not her. Then came the monasteries. The monks wrote their books in Latin, but left our English pure. The English speech was a plant of Northern growth. This language and our early history should teach us, when a question arose as to English thought and style, the absurdity of the Latin school. The freedom of speech, the customs and modes of thought which we cherished, were all of Scandinavian origin. The Romans were never our ancestors, but the Romans tried to stamp us out. He came to say something which would sound unfamiliar. Our early home was Scandinavian; we were from the South of Scandinavia proper. Therefore some of the roots of our words would be found more like those of the Germans than if we had dwelt farther north. Of course, in tracing the early history of a people, the effects of climate and religion in forming habits of life had to be borne in mind. The people of Scandinavia were accustomed to cold and hunger and thirst, and they had to contend with wolves and bears and other wild animals. The first requirement of man was food, and accordingly our ancestors manufactured rude weapons with which to slay the animals, the flesh of which was to yield them food. In the far north there was a preference for the flesh of boars, but in the south and far east the swine was an abomination. Our forefathers had soups of the most appetising and nutritious kind, made from the flesh of birds, rabbits, venison, &c. They were also in possession of the knife and the perforated spoon, a refinement that showed them to advantage. In Scandinavian homes of the fourth century, halls for the refection of warriors by great chieftians were numerous, and in early representations of a meal, we found the knife, the spoon, and plate laid on the table. Our forefathers came to Britain as people now went to New Zealand, and no nation was more rich than the Anglo-Saxons in tales of the past. In the centre of the hall stood the hearth, which was never absent from the great houses of our ancestors of the sixth century. They had smoked meats and beaten fish, puddings, oyster patties, loaves large and small of various kinds of bread, eggs, cheese, and butter. From very early times the table-cloth was in common use. Our ancestors had various kinds of drinks, and wine was imported from Italy. They had the swan, duck, water-fowl, salmon, eels, pilchards. All food that required it was sweetened with honey. There were pears, peaches, melons, plums, cherries, and altogether the Anglo-Saxons were well provided in the matter of food. The lecturer made copious extracts from Sharon Turner's "History of the Anglo-Saxons," which, he said, had never been approached for accuracy by any other work on the subject. From the almost innumerable articles of food and drink mentioned by him, it was evident that the Anglo-Saxons by no means fared badly. Friar Tuck, although a portraiture of a later age, was alluded to as not being a bad sample of the Anglo-Saxon of the tenth and eleventh centuries, as far as good living was concerned. The lady of the house had her special seat when she was present. On some occasions the ladies sat side by side with the warriors. Coming to the next branch of his subject, Mr. Hodgetts observed that of course in the matter of dress woman reigned supreme. The Anglo-Saxon ladies were distinguished by the wimple or hood. Their dresses were very long, covering the feet; they were loose, the sleeves being tight at the wrist. There was no attempt at distortion of the body in order to make a waist. The mantle was also a part of their attire. The costume of the females in those days was characterised by greater simplicity than that of the males. The true Englishwoman was in the sixth century as she was now, modest, proud, and good. The warrior was certainly rather "loud" in his attire. Woman's dignity supplied that attraction which men had to borrow from dress. Let us be proud of our English mothers and honour them in their descendants. The Normans were not English, so his remarks did not apply to them. The lecturer proceeded to say that dyes of various colours were in common use, and alluded to a variety of specimens of ornaments worn in Pagan times; these ornaments could be inspected in the British Museum, and would be found interesting. Ladies had bracelets, necklaces of amber, exquisite beads, &c. The hair was worn plaited behind or round the head like a coronet. The mantle was richly edged with gold. There was one mantle worn for ornament, and a larger one well lined with fur to keep out the cold. The boots were neatly made. It did not appear that since the introduction of Christianity very great progress had been made in the matter of female costume. After some further remarks, Mr. Hodgetts said that he found he had not time to enter upon the history of Anglo-Saxon houses, as he had intended, but on a future occasion he might have an opportunity of going fully into the subject.

The Chairman (Mr. Morgan) expressed regret that Professor Hodgetts had been compelled to leave out the third part of his lecture, but he had given them a very interesting account of the language, food, and costume of the Anglo-Saxons, and he was sure the ladies would join him in cordially thanking the lecturer. No doubt many of them would take an opportunity of inspecting the specimens of ornaments which had been referred to as being in the British Museum.

Captain F. S. Dumaresq de Carteret-Bissou agreed with the lecturer that for beauty there was nothing to compare with the pure English language. As regarded the female dress in early periods of history being a loose one, he happened to have been at a lecture given on English dress by Mr. Lewis Wingfield, at which a breast-plate like a piece of armour was exhibited as worn by Queen Boadicea.

The lecturer, in acknowledging the vote of thanks, remarked that there never was a breast-plate worn by a lady or anybody else in the fourth century. Again, Boadicea was not an English woman. If she had a tight-fitting dress *our* female ancestors had none.

The proceedings terminated with a vote of thanks to the chairman, moved by Mr. Trendell.

The Proposed New Battersea Bridge.—It is stated that the Metropolitan Board of Works have decided to construct a temporary foot-bridge across the Thames during the building of the new Battersea Bridge.

Illustrations.

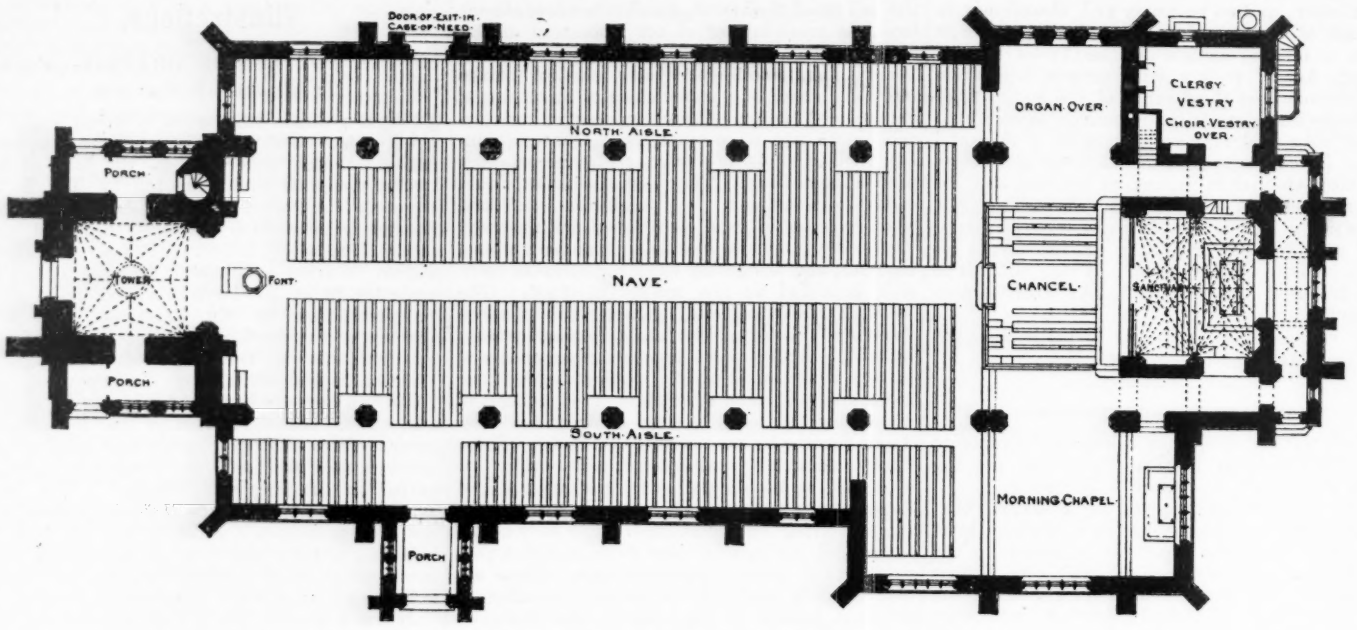
DESIGN FOR THE DECORATION OF THE DOME OF ST. PAUL'S.

WE publish this week a small copy of the coloured cartoon of the proposed mosaic decoration for the dome of St. Paul's, designed and executed by Mr. E. J. Poynter, R.A.; with the exception of the larger circular panel, which has been designed and executed by Sir F. Leighton, P.R.A. The illustration is from a coloured drawing specially made for us at Mr. Poynter's studio, and with his permission, by Mr. Raimbach. We add also larger illustrations in monochrome of the two subjects in the large circular panels, "Christ in Judgment," by Mr. Poynter, and "The Sea gave up her Dead," by Sir F. Leighton. These are reproduced by the "ink-photo" process, from photographs taken by Mr. Bedford Lemere, and are therefore absolutely correct, as far as drawing and design.* We have thought that many of our readers, professional and non-professional alike, would be glad to have a carefully-executed representation of a work which is of national interest, and which is likely to excite much attention at present.

It was expected that by this date the cartoon would be fixed in its place in the dome and exposed to public view; and we had not intended, in fact, that our publication of the design should anticipate the exhibition of the original; but we understand that unforeseen difficulties in fixing the cartoon, as well as other causes, have retarded the preparations longer than was expected, and it will probably not be open to public inspection for a few days yet.

From a memorandum furnished to us by Mr. Poynter we collect the following statements as to his ideas in regard to the design. When he was first consulted on the subject the idea was that Alfred Stevens's design should be carried out, the subjects in the large circular panels and the seated figures below alone being changed. Stevens's design illustrated the Old Testament; he only designed half the dome, and it is not clear what his intentions were in regard to the other half. The work he actually did covers about the same ground as the ceiling of the Sistine Chapel. The Committee thought these subjects unsuitable for that part of the cathedral, and preferred that the subject should be taken from the Book of Revelations, and that the figures of prophets below should be replaced by the figure of St. John the Evangelist and those of the bishops of the Seven Churches of Asia,—not, to our thinking, a very happy idea, as the eight figures in the eight compartments of the dome certainly should all be of equal importance; the architectural conditions offer no suggestion for making one figure predominate over the rest, as St. John certainly should predominate over the bishops. However, this was the idea: the general lines of Stevens's design were to be followed. Sir F. Leighton was commissioned to paint the subjects of the eight large circles, and Mr. Poynter was commissioned to draw out the whole design, and to design the subjects of the smaller circular compartments above. Stevens's design divided the dome into eight compartments, by what might, for want of a better name, be termed ribs, answering to the eight blocked-up windows or solid piers of the drum, each compartment containing two circles, the upper one necessarily smaller than the lower. The "ribs" are built up of figures and architecture; above each pedestal which forms the base are three magnificent nude figures, an imitation of Michelangelo in style, but of which Mr. Poynter observes that Michelangelo himself perhaps never did anything finer. The reasons for putting aside this fine work were twofold. Some of the committee thought nude figures unsuitable,—an objection which, considering the entirely abstract and ideal character of the figures, we should call merely a truckling to the Philistine; but a more logical objection was that these living figures supporting a mass of architecture were performing a perpetual acrobatic feat, and it was impossible to avoid the feeling that if one of them made the slightest movement the whole thing would come toppling down. It was obvious that it was necessary to give to the whole "rib" a truly architectural character, and that the retaining of Stevens's figures would render this

* We are indebted to the courtesy of the Dean and Chapter for the opportunity of photographing Sir F. Leighton's painting, which had been for some time completed and under their charge.



Church of St. Mary, Portsea.—Plan. Scale, 32 ft. to 1 inch.

an impossibility, so that there was no alternative but to abandon them. Accordingly the ribs were designed as an architectural framework, as seen in the present illustration, with figures niched in them; and it occurred to Mr. Poynter that these figures should be brought into relation with the Apocalyptic subjects in the main compartments. The most suitable way of doing this seemed to be to represent in these figures the chorus of praise, "Worthy is the Lamb" (Rev. iv., 12, 13), and thus give to these otherwise merely decorative figures a distinct meaning. He therefore replaced Stevens's upper groups of three struggling figures by three angels singing, and who are supported by the architecture instead of supporting it; and with these it is proposed to alternate groups of martyrs who also surrounded the throne. Above, instead of the single angel who supports the cornice in Stevens's scheme, are placed two youthful cherubs, seated singing (in the style of the old Italian pictures), and for the group of nude figures (finally and regretfully set aside), Mr. Poynter has substituted groups representing saints on earth, each accompanied by an angel, these groups being also designed to illustrate some appropriate text from one of the Psalms of Praise. In a circle above all, which was run round under the lantern, will be the "Four-and-twenty Elders," and it is proposed to continue the illustration in the lantern with "the four beasts" (as the word is quaintly translated in our Bible), and the Agnus Dei in the centre at the top of all.* There will be thus a consistent scheme for all the figures external to the panel subjects, beginning at the top with the Lamb to whom praise is sung, and continuing downwards in proper order of progression through the four beasts, the four-and-twenty elders, and the angels and martyrs, to the saints on earth receiving inspiration from angels, and lowest of all to the seven churches, who are the embodiment of Christ's church, with St. John as the central figure. The portion now designed includes the figure of St. John hearing the voice saying "What thou seest write in a book"; the voice being symbolised by the angel descending and putting a pen in his hand; a cherub holds the book. The lower group on the rib illustrates the verse "Ye holy and humble men of heart, bless ye the Lord"; and appropriate texts in the same spirit will be found for all the others which are to be executed hereafter. The subjects of the panels are prescribed by the Committee, and are sufficiently noted in the titles to the illustrations. The upper one Mr. Poynter has kept as simple as possible, owing to the great height at which it will be seen, and the same feeling seems to have influenced Sir F. Leighton in the composition of his panel.

Thus the general disposition of Stevens's design is retained; the panels and the ribs remain where they were, and the groups of figures remain in the same places; but the meaning and detail of the whole is changed. Indeed, it may be said that Stevens's design in many of its features, grand as it is, has little or no meaning, which is certainly a serious critical objection to it.

We have confined ourselves to description at present; when the actual cartoon is visible *in situ*, so that its effect as seen from below can be judged of, we may have further remarks to make. We may add here that a good deal of gold will be introduced into the mosaic design, but it has not been thought advisable to use actual gold in our small illustration, as the effect would be quite different on a small scale. The two circular panels in our larger illustrations are shown the same size; their actual relative dimensions can be seen from the general illustration.

*The drawing of these so as to have an intelligible appearance to the eye from below will be, we should say, a curious and rather tough problem in perspective.

NEW PARISH CHURCH OF ST. MARY, PORTSEA.

THIS church is designed to take the place of the present one, which is an unsightly and inconvenient structure.

The new church will be built in sections, of which it is proposed first to undertake the nave and aisles, affording accommodation for 1,400 adults on the floor. It is intended that the completion of the church should, if necessary, be spread over several years, and that nothing should be done to curtail or mutilate the original design permanently. The tower will probably be the last section to be built.

The walls of the church will be constructed with an outer casing of flints, stone ashlar within, and between these a filling in of Portland cement concrete. A dado of red terra-cotta will be carried round the walls internally. Doulting stone will be used for the external stonework and Bath stone within.

The roofs will be of open timber, except that over the sanctuary, where there will be a ceiling of groined stone covered externally with leaded roof of flat pitch.

The view of the church is reproduced from the drawing which is at present in the Architectural Room at the Royal Academy. We propose to give the sections of the church in a subsequent number, as the interior design presents some details that are unusual and interesting. The whole church promises to be an exceptionally fine one when completed.

PRAYER-DESK, HOARWITHY CHURCH, HEREFORDSHIRE.

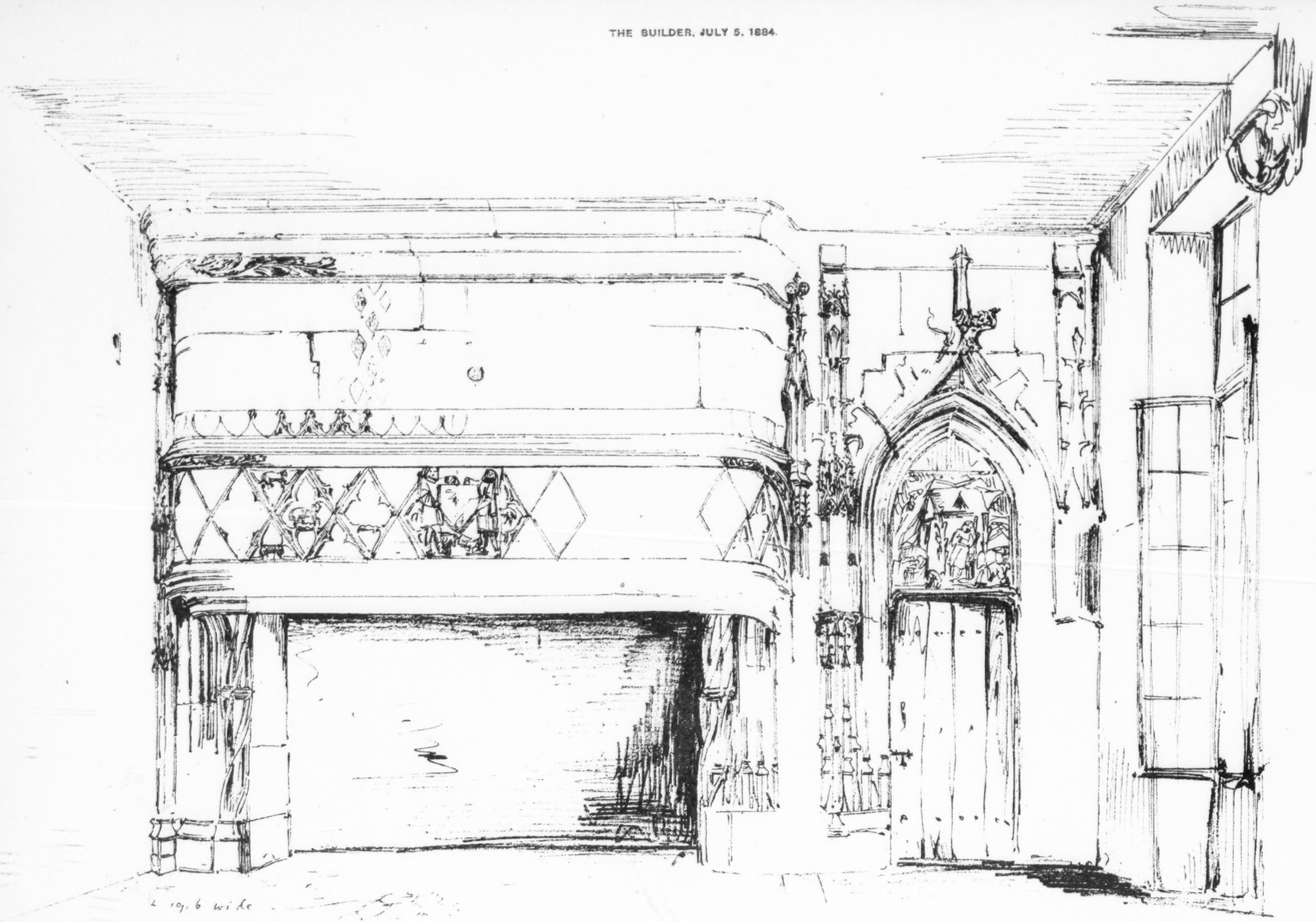
THE prayer-desk which we illustrate this week has been executed by Mr. Harry Hems from the designs of Mr. J. P. Seddon, for Hoarwithy Church, near Ross, Herefordshire, of which Mr. Seddon is the architect. The prayer-desk is devoted, as far as its sculpture subjects are concerned, to the illustration of the legend of St. Dubricius, who is traditionally supposed to have had a large monastery almost upon the site where stands the present church. The right panel of the front of the desk represents the birth of the Saint, whose mother was condemned to be burned alive, and was found the next morning sitting on the funeral pile with a new-born babe in her arms, the future St. Dubricius, who is represented in full canonicals in the adjoining panel. The side panel on the right in our illustration shows the Saint casting out the Devil from a woman (an achievement which has tasked the efforts of saints in various ages), and on the panel seen on the left he is setting to rights an unfortunate monk who was accused of having stolen wine from the cellar of the fraternity, a charge which was satisfactorily but rather illogically disposed of by the Saint, who blessed the barrels and caused wine to flow from them again. It is to be hoped the brother was really wrongfully accused, and that the Saint was not *particeps criminis*.

Whether it is worth while, or even in every sense suitable, to decorate a modern church with these rather foolish legends, to which, it will be observed, no moral whatever attaches, is a question we do not discuss, and which we should, perhaps, be told was out of our province. We give the desk merely as a good piece of work in design and execution, rather inclining to wish that both architect and carver may on another occasion light upon an historical subject better worth treating.

THE MURRAY TOMB, ST. ANDREW'S, WELLS-STREET.

As something special was said at the recent Conference of Architects about the late W. Burges and his works, we need not apologise for illustrating a very pleasing design of his, executed a good many years ago, but which, we believe, has not been published hitherto. It is a monument in St. Andrew's, Wells-street, and is a remarkable example of Burges's large and bold treatment of Gothic detail. It is photo-lithographed from a pencil drawing by Mr. J. Attwood Slater, which has its interest also as a good example of architectural sketching.

By an unfortunate oversight, this was named in an advertisement last week as from an original sketch by Burges himself; a mistake arising out of the fact that we were arranging for the publication of some original pencil sketches by the late G. E. Street, and a phrase intended for the one item in the advertisement was inadvertently applied to another. The publication of the Street sketches was not announced, as their reproduction in lithograph presented some difficulty, and rendered their immediate publication doubtful. This has been surmounted, however; and in place of one original sketch by Burges which was promised, we are able to give two by Street which were not promised, which we hope will be regarded as restoring the balance of accounts between ourselves and our readers.



IN CHARLES VIIth's HOUSE, BOURGES.

FROM AN ORIGINAL SKETCH BY THE LATE G. E. STREET, R.A.

C. F. Kell Photo-Lith. & Printer, 6 Castle St. Holborn, London E.

PRAYER DESK
Illustrating life of S. Dubricius
HOARWITHY CHURCH HEREFORD
J.P. SEDDON ARCHT. 1884
made by HARRY HEMS EXETER.

PRAYER DESK
Illustrating life of S. Dubricius
HOARWITHY CHURCH HEREFORD
J.P. SEDDON ARCHT. 1884
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made by HARRY HEMS EXETER.

"INK-PHOTO", SPRAGUE & Co., LONDON.

"INK-PHOTO," SPRAGUE & Cº, LONDON.

'DECORATION FOR THE DOME, ST. PAUL'S.

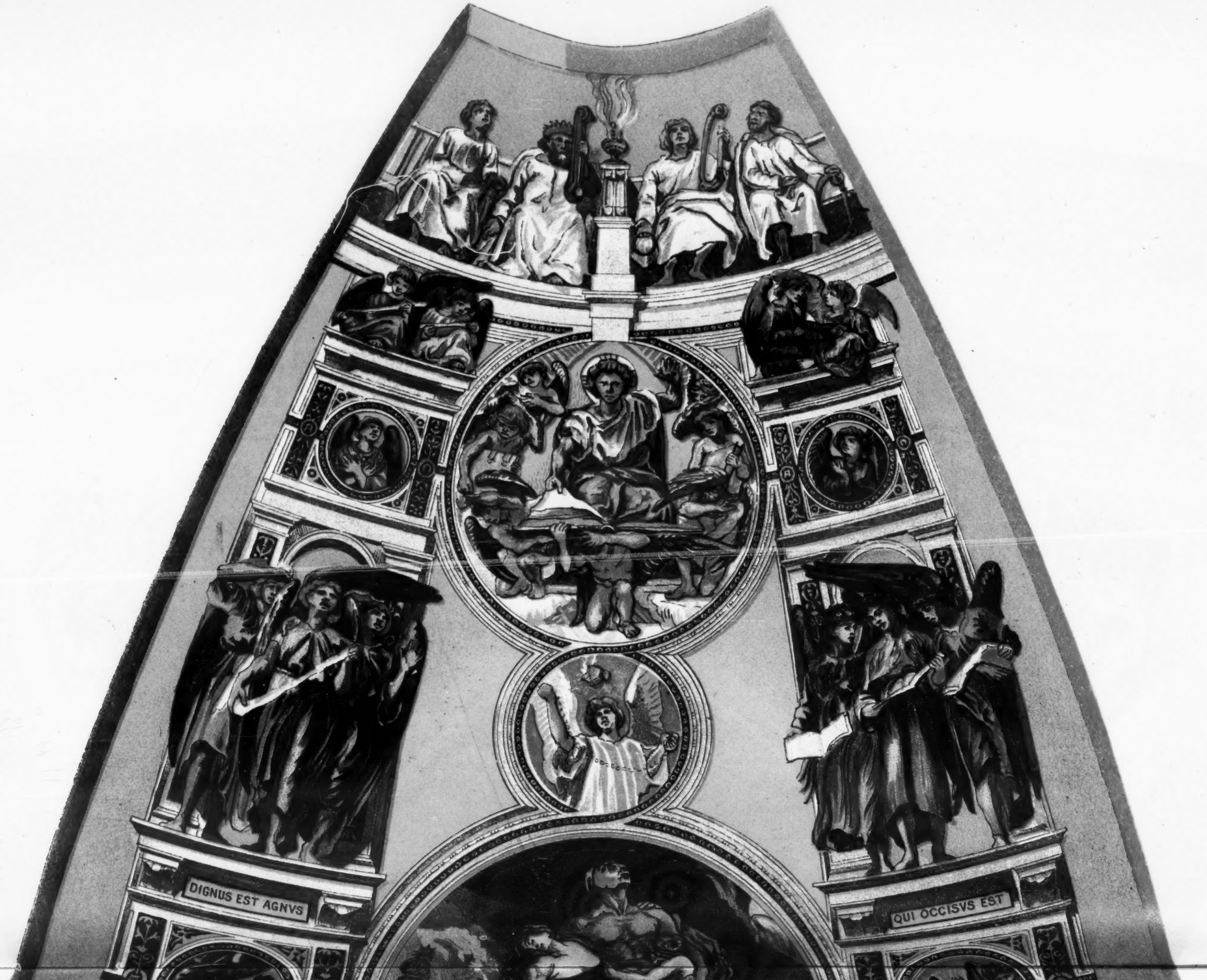
The Upper Circular Panel: "Christ in Judgment."

Designed by Mr. E. J. Poynter, R.A.

Vincent Brooks, Day & Son, Lith.

ST. PAUL'S CATHEDRAL.

Copy of full-sized Cartoon for proposed Mosaic Decoration of the Dome. Designed by Mr. E. J. Poynter, R.A.
The central circular compartment by Sir F. Leighton, P.R.A.


DIGNUS EST AGNVS
QUI OCCISVS EST

"INK-PHOTO", SPRAGUE & Co. LONDON.

DECORATION FOR THE DOME, ST. PAUL'S.

The Lower Circular Panel: "The Resurrection."

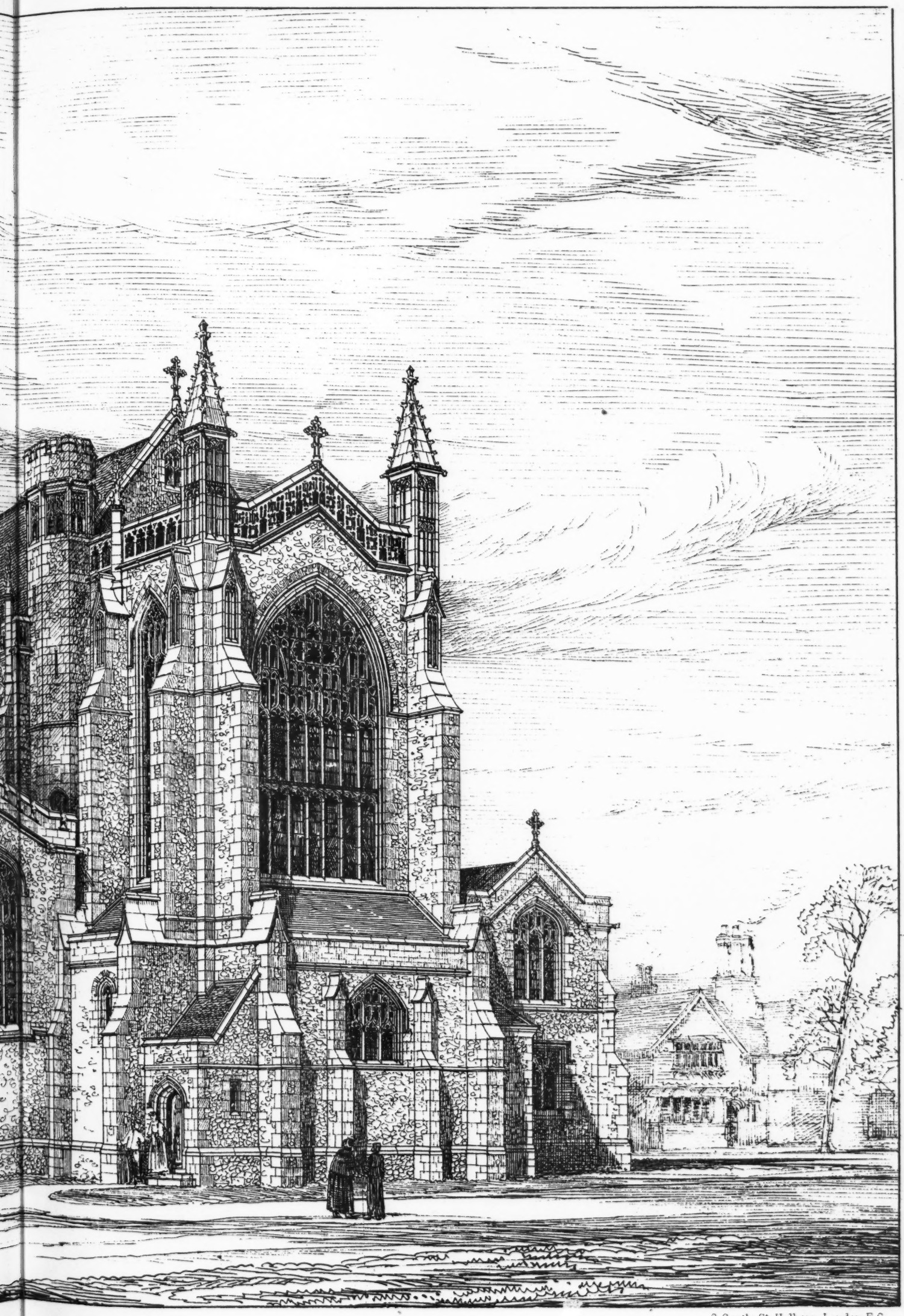
("The sea gave up the dead which were in it.")

Designed by Sir F. Leighton, P.R.A.

C. F. Kell Photo-Lith. & Printer.

NEW PARISH CHURCH OF S

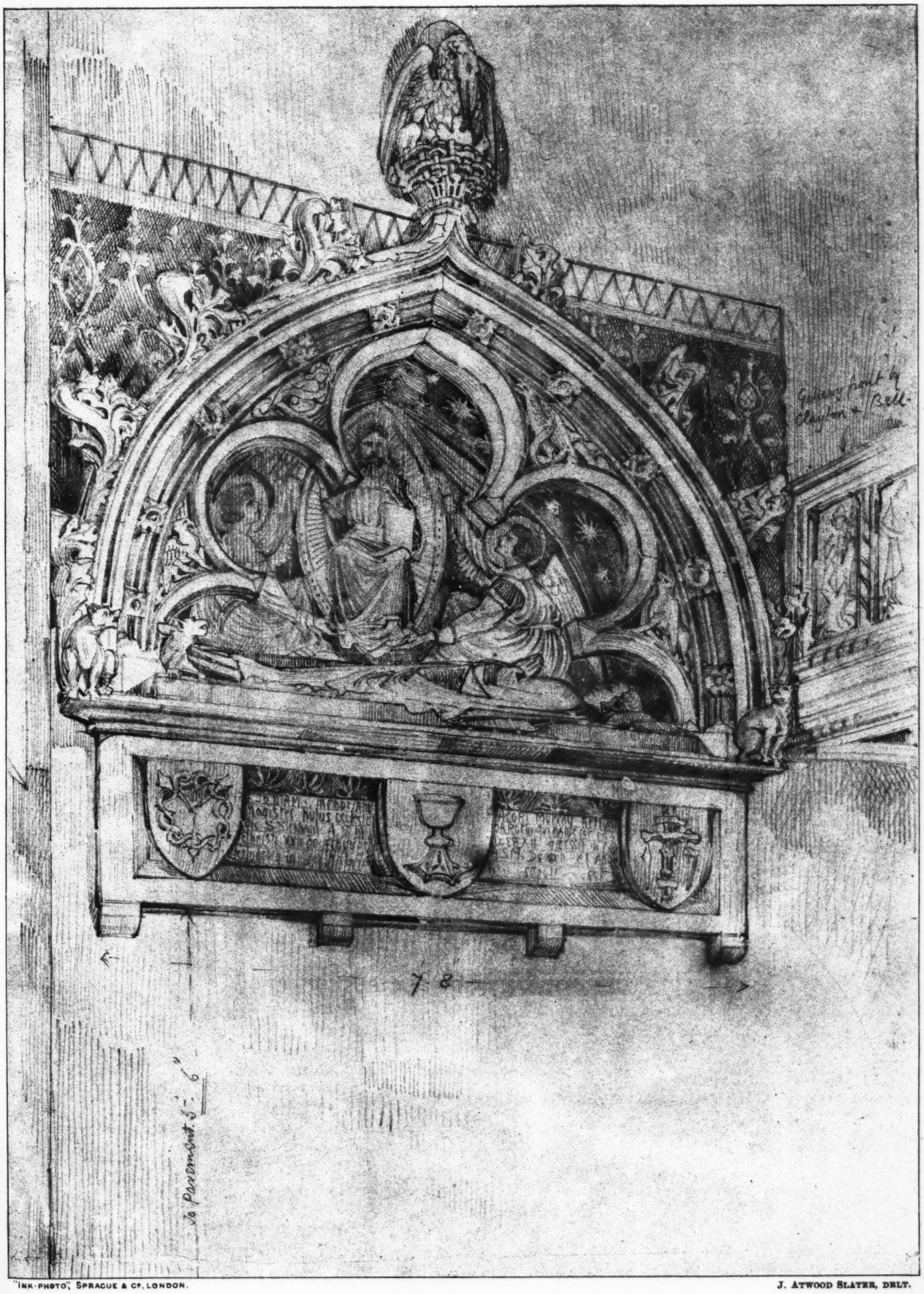
Mr. A. W. Blomfield, M



8, Castle St Holborn, London E.C.

CH OF ST. MARY, PORTSEA.

OMFIELD, M.A., ARCHITECT.



"INK-PHOTO," SPRAGUE & Cº, LONDON. J. ATWOOD SLATER, DELT.

THE MURRAY TOMB. ST. ANDREW'S CHURCH, WELLS STREET, W.

THE LATE WM. BURGES, A.R.A., ARCHITECT.

C F Kell Photo-Lith & Printer 8, Castle St Holborn London E.C.

BOURGES CATHEDRAL

FROM AN ORIGINAL SKETCH BY THE LATE G. E. STREET, R.A.

TWO SKETCHES BY THE LATE G. E. STREET, R.A.

THESE two sketches at Bourges are two out of half a dozen pencil sketches by Street which his representatives have placed in our hands for publication. They show at once what they are; the rapid sketches of an architect, seizing the main outline and effect in a few comprehensive lines, and filling in as much of the detail as was necessary as a memorandum. The others of the series we hope will follow, but it depends somewhat on fate and sunshine: pencil being a doubtful and capricious medium for reproduction by photo-lithography.

THE WORK OF MEDIÆVAL AND MODERN CRAFTSMEN.

THE SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

THE seventh annual meeting of this society was held on Tuesday afternoon in the Hall of the Society of Arts. The Hon. R. C. Grosvenor, presided, and, in moving the adoption of the report, observed that the committee had been much assisted in their work by their secretary, Mr. Thackeray Turner, who was a gentleman thoroughly competent to look at a building and see at a glance whether it was worthy of being preserved; and since they had had the advantage of his services the committee had been able to act with greater vigour and success than previously.

Mr. H. W. Brewer seconded the motion, and the report was adopted unanimously.

Mr. William Morris then read a paper on "The Essential Difference between the Work of the Mediæval and the Modern Craftsman." He commenced by observing that the members of that society, at least, knew the beauty of the weathered and time-worn surface of an ancient building, and they had all felt the grief of seeing that surface disappear under the hand of the restorer, but though they all felt that deeply enough, some of them might perhaps be puzzled to explain to the outside world the full value of that ancient surface. He was sure that, as members of that society, they could not doubt that in one way or another the surface of an ancient building,—that was, the handling of the old handicraftsman,—was most valuable and worthy of preservation, and he was sure also that they felt instinctively that it could not be reproduced at the present day. The attempt at reproduction not only deprived them of a monument of history, but also of a work of art, and he had to attempt the task of showing that this impossibility was not accidental, but was essential to the conditions of life at the present day,—that it was caused by the results of all past history, and not by a passing taste or fashion of the time. Consequently no man or body of men, however learned they might be in ancient art, whatever skill in design or love of beauty they might have, could persuade, or bribe, or force the workmen of to-day to do their work in the same way as the workmen of the time of King Edward I. did theirs. It must be admitted that every architectural work was a work of co-operation. The very designer, be he ever so original, paid his debt to this necessity in being in some form or other under the influence of tradition. Dead men guided his hand even when he forgot that they ever existed. But, furthermore, he must get his ideas carried out by other men; no man could erect a building with his own hands. In all co-operative work, the kind and quality of that work,—the work of the ordinary handicraftsman,—was determined by the social conditions under which he lived, which differed very much from age to age. Let them try to see how they differed, and glance at the results to art of that difference, during which inquiry they would have much more to do with the developed Middle Ages, with which the work of their Society was chiefly concerned, than with any other period. In the Classical period, industrial production was chiefly carried on by slaves, whose persons and work alike belonged to their employer. It was natural that, under such circumstances, industrialism should be despised; but under Greek civilisation at least, ordinary life for the free citizens,—the aristocracy, in fact,—was simple. The climate was not exacting of elaborate work for the purposes of clothing and shelter; the race was yet young, vigorous, and physically beautiful. The aristocracy, therefore, freed from the necessity of rough and exhausting work by the possession of chattel slaves, and little oppressed by anxieties for their livelihood, had both inclination and leisure to cultivate the higher intellectual arts. Well, the ideal of art established by the intellect of the Greeks with such splendid success lasted throughout the whole Roman period also, in spite of the invention of the arch in architecture, or rather in building. The open-mouthed contempt for the results of industrial production expressed by the pedant Pliny, whether it were genuine, or artistically deduced from the conventionalities of philosophy, well illustrated the condition of the slave-produced lesser arts of the later classical period. Meantime, and while Pliny was alive, the intellectual arts of classical times had long fallen from their zenith, and had to wade through weary centuries of academicalism, from which they were at last redeemed by the break-up of classical society itself, which involved the change of chattel slavery, the foundation of classical society, into serfdom or villeinage, on which the feudal system was based. The serf in the earlier Middle Ages was, however, in a very different condition from the chattel slave, for certain definite duties being performed for his lord he was (in theory at least) at liberty to earn his living as he best could within the limits of his manor; the chattel slave, as an individual, had the hope of manumission, but, collectively, there was no hope for him except in the complete and mechanical overturn of the society which was founded on his subjection. The serf, on the other hand, was, by the conditions of his labours, forced to strive to better himself as an individual, and collectively soon began to acquire rights amidst the clashing rights of king, lord, and burgher. Also quite early in the Middle Ages, a new and mighty force began to germinate for the help of labour,—the first signs of secular combination among freemen, producers, and distributors. The guilds, whose first beginning in England dated from before the Norman Conquest in all probability, had their roots in that portion of the European race who had not known of Rome and her institutions in the days of her temporal domination. England and Denmark were the foremost countries in the development of the guilds, which took root latest and most feebly in the Latinised countries. The spirit of combination spread, and the guilds, which had at first been rather benefit societies or clubs than anything else, soon developed into bodies for the protection and freedom of commerce, and rapidly became powerful merchant guilds. In the height of their power there was formed under them another set of guilds whose object was the regulation and practice of crafts in freedom from feudal exactions. By the beginning of the fourteenth century the supremacy of the craft guilds was complete. At that period their constitution was thoroughly democratic. Pure journeymen there were none; the apprentices, as a matter of course, took their places as masters of their craft when they had learned it. The craftsman of that day lived far easier than his successor now. He made his wares himself and sold them himself to the man who was going to use them. Some of the rarer goods, such as silk cloth, did come into the chaffering market, but even these were made primarily for home consumption, and only the overplus came into the hands of the merchant, who was not a mere gambler in the haphazard of supply and demand, but an indispensable distributor of goods. The people were good judges of manufactured wares, and consequently adulteration was scarcely known. The freemen of the guilds had their share in the pasture lands of the country. Port Meadow, at Oxford, for instance, was the commonal pasture of the freemen of that city. The English craftsman of the fourteenth century was not a priest-ridden or down-trodden savage, but a thoughtful and vigorous man, and in some sense free. He worked not for the profit of a master, but for his own livelihood, which he did not find difficult to earn. He had a good deal of leisure, and being master of his time, his tools, and his material, he could afford to amuse himself by giving artistic finish to his work. That artistic finish was not venal,—it was given freely to the public, who paid for it by interest in, and sympathy for, the work itself. What is called in modern slang the wages of genius were much neglected by the builders of ancient buildings; for art, as Mr. Thorold Rogers justly said, was wide-spread; the possession of some skill in it was the rule, and not the exception. As a rule, those who could afford to pay for a building were able to do the necessary planning and designing, obviously because they would naturally find help and harmonious intelligence among the men they had to employ. For instance, the tower of Merton College, Oxford, was carried out by ordinary masons under the superintendence of the Fellows of the College. Judging from the wretched tinkering that the present Fellows had allowed to be perpetrated on their beautiful little house at St. Alban's Hall, he would not venture to trust them with such a work now. When they heard it said that extra money payment was necessary under all circumstances to produce great works of art, they could appeal to the witness of those lovely works still left to them, whose unknown, unnamed creators were content to give their talents to the world with little more extra wages than their pleasure in the work and their sense of usefulness in it. Well, it seemed to him that a body of artificers so living and so working with simple machines, of which they were complete masters, had very great advantages for the production of architectural art. But as the towns grew bigger, and population flowed to them from the enfranchised field-serfs and other sources, the old craftsmen began to form a separate and privileged class in the guilds, with their privileged apprentices, and the journeyman at last made his appearance. After a while the journeymen attempted to form guilds under the master crafts, as the latter had done under the merchant guilds, but the economic conditions of the time, tending towards manufacturing for a profit, beat them, and they failed. Nevertheless the conditions of work did not change much, until the first quarter of the sixteenth century, during which England, from being a country of tillage, cultivated for a livelihood, became a grazing country farmed for a profit. This had a very direct influence upon the conditions of life and manner of work of the artisans, for the crafts were now flooded by the crowds of landless men who had nothing but the force of their bodies to live upon, and were obliged to sell that force day by day for what those would give them who certainly would not buy the article labour unless they could make a profit by it. The Reformation itself was but one of the aspects of the new spirit of the time produced by great economical changes which dealt with Art and its creator Labour far more completely than any series of accidents could do. Though there was still a good deal of what might be called domestic manufacture, the workmen in the towns became more dependent on their employers,—more and more mere journeymen,—and a great change was coming over the manner of their work. Division of labour now began, and speedily gained head. Almost all goods, except those made in the most domestic way, had now to go through the market before they reached the user's hands; they were made for sale, not primarily for use. The division of labour had so worked that instead of all workmen being artists as they once were, they were divided into workmen who were not artists and artists who were not workmen. This change was complete, or nearly so, by the middle of the eighteenth century. The gradual degradation of the arts from the fifteenth century to this point was steady and certain. The picture-painters, what few of them were aught else than mere pretentious daubers, were turned into courtly flatterers of ill-favoured fine ladies and stupid supercilious lords. As for the architectural arts, what could be expected from a set of human machines,—co-operating, indeed, but only for speed and precision of production, and designed for, at best, by pedants who despised the life of men, and, at worst, by mechanical drudges little better in any way than the luckless workmen? Whatever might be expected, nothing was got but that mass of foolish toys and costly ministrations to luxury and ostentation which had since those days been worthily continued under the name of upholstery. But that was not the end of the degradation of the arts. At the close of the eighteenth century the manufactures in England were still secondary to her merely country life, and mixed with it. In fifty years more England became the manufacturing country of the world; the "workshop of the world," often so called with much pride by her patriotic sons. This strange and most momen-

tous revolution was brought about by the machinery which the chances and changes of the world forced on the population. Whereas under the eighteenth-century division of labour system a man was compelled to work for ever at a trifling piece of work in a base mechanical way, under the system of the factory and the almost automatic machines of the present day, he might change his work often enough. He might be shifted from machine to machine, and scarcely know that he was producing anything at all. In other words, under the eighteenth-century system he was reduced to a machine; under that of the present day he was the slave to the machine. The machine workman had to be well skilled, at least, in his contemptible task; the slave to the machine needed but little skill, and, as a matter of fact, his place had been taken by women and children, and what skill was needed in the work was in the overlooking of the labours of these latter. In short, the present system of the factory and its dominating machine tended to do away with skilled labour altogether. They set their slave to the machine to do the work of the free Mediæval workman, or of the man of the Transition period, indifferently. They had learned the trick of masquerading in other men's clothes, and carried on a strange hypocritical theatrical performance, rather with timid stolidity than with haughty confidence, determined to shut their eyes to everything seriously disagreeable, nor heeding the silent movement of real history which was going on around and underneath their raree show. Surely such a state of things was a token of change,—speedy perhaps, complete certainly,—of the visible end of one cycle and the beginning of another. The society of to-day, anarchical as it was, was nevertheless forming a new order, of which the members of the Society he was addressing, in common with all those who had the courage to accept realities, were and must form a part. They were contending for the reality of art; that was to say, the pleasure of the human race. The tendency of the commercial or competitive society which had been developing for more than 300 years had been towards the destruction of the pleasure of life. But that competitive society had at last developed itself so far that its death was approaching. When society was so reconstituted that all citizens would have a chance of leading a life made up of due leisure and reasonable work, then would all society resolve to protect ancient buildings from all damage, wanton or accidental; for they would begin to understand that these were a part of their present lives,—a part of themselves. That would come when the time was ripe for it; for at present if people knew of their loss they could not prevent it, since they were living in a state of war,—that was to say, of blind waste. Surely the members of that society had had this truth driven home practically often enough. They had often had to confess that if the destruction of an ancient monument of art and history was a matter of money it was hopeless striving. Let them admit that they were living in a time of barbarism, betwixt two periods of order,—the order of the past and the order of the future,—and then, though there might be some of those who thought, as he did, that the end of that barbarism was drawing near, and others that it was far distant, yet they could work together to preserve what relics of the old order were yet left them for the instruction, the pleasure, the hope of the new.

A vote of thanks was given to Mr. Morris for his address.

City of London Society of Artists.—On the evening of the 27th ult., on the invitation of the Lord Mayor, a large number of ladies and gentlemen assembled at a *conversazione* in the Library of the Guildhall, to meet the members of the City of London Society of Artists, which was established four years ago. The object of the Society was to form a permanent Gallery and an Academy for the instruction in the higher grades of the Fine Arts, as well as to sell or otherwise dispose of pictures, sculpture, or other works of art exhibited from time to time by its members. So successful has the project proved that the Society now consists of 67 members of the Royal Academy and other eminent artists, 167 Fellows and Guarantors, and many members of the Corporation.

SANITARY LEGISLATION.

CONFERENCES AT THE HEALTH EXHIBITION.

ON Thursday and Friday, the 26th and 27th of June (as mentioned in our last, p. 953), conferences were held on the above subject under the auspices of the National Association for the Promotion of Social Science. Sir Richard Temple, bart., the President, occupied the chair, and opened the proceedings by calling upon Mr. Francis S. Powell to read an introductory address.

Mr. Powell, in the course of his paper, stated that the Statute-Book bore record that during many centuries the nation was in some measure, according to the knowledge of those times, alive to the necessity of protection against nuisances and other conditions dangerous to health. It was, only, however, since the commencement of the present century that Parliament had passed Acts of wide range. This country, indeed, must always be remarkable for the rapidly-increasing density of the population; for the insanitary conditions incident thereto; for the energy and knowledge applied to the diminution and removal of those conditions; and, lastly, for the stringency of the statutes dealing with this class of evil. The visitations of Asiatic cholera were, no doubt, a principal cause of the mind of the country being aroused to the necessity, as well as the duty, of thoroughly investigating and legislating upon matters relating to public health. The General Board of Health, the first central authority, was established in 1847, and this was followed by a series of general statutes and by Lord Norton's Sanitary Commission, which recommended various valuable reforms. These reforms were sanctioned by Parliament, and in 1875 Mr. Sclater-Booth's Public Health Act was passed. Few statutes had so long and so well stood the test of public criticism. Under that Act much that was permissive was made compulsory, and there was but one authority for public health purposes in every place, whilst one central authority presided over both the Sanitary and the Poor Law Authorities throughout the country. Complaints had been made of want of powers, but it was by no means certain that this was well founded, if the 340 sections of the Act were well enforced. Experience had taught him that powers which were necessary in dense populations would be intolerable in rural districts. The statute contained a provision for conferring urban powers on rural authorities, thus enabling districts to obtain the advantages without experiencing the inconvenience of urban powers. It was a satisfaction to him (Mr. F. S. Powell), as the author of this provision, to observe the results. Before May, 1833, 444 orders conferring those urban powers had been issued, and those districts had thus obtained by a simple procedure the benefit of any urban power which the circumstances required. The sections of the Public Health Act which would first demand reconsideration were probably those which related to offensive trades. Meanwhile, the Alkali &c. Works Regulation Act of 1881 imposed severe restrictions on the conduct of alkali works, and what might, in general terms, be described as chemical works. By the operation of this Act 976 works were registered up to the close of 1882, and there was good reason to hope that the sections of this Act, and the action of the inspectors under it, would restore vegetation to wide districts which were blighted by noxious emanations, and render them once more such that the inhabitants might dwell therein without suffering inconveniences destructive to comfort and the enjoyment of life. Mr. Powell next referred to the Act for the Prevention of the Pollution of Rivers, passed in 1876, remarking that the most difficult problem,—that of the Thames Valley,—was still not satisfactorily or finally solved. Although the question of water-supply had occupied much of the attention of the Legislature for ten years past, it could not be regarded as certain that the people of this country were duly impressed with the necessity of obtaining an ample supply of wholesome water, or of guarding from contamination the water when supplied to each house. He thought there was much reason to regret that the Legislature had not made general the principle embodied in many local Acts which enforced the notification of infectious disease. Public attention was at length aroused, and was fully directed to the most complicated question of the homes of the people, but it was premature to further remark upon this matter until the issue of the Report by the Royal Commission. It should not be forgotten, however, that the homes of the people depended upon the people themselves, and that neither cubic space, nor sound construction, nor sanitary arrangements, would attain their end if indolence suffered dirt to remain; if neglect failed to make due use of the best appliances; if reckless, almost savage, violence destroyed that which was provided for the comfort, nay, even the safety of life. Education itself, unless due regard were paid to the conditions of youthful life, was proved to be a danger.

Mr. H. H. Collins, F.R.I.B.A., then read a paper entitled "What Conditions are essential for a Healthy Dwelling, whether in an Urban or in a Rural Locality; and how far is it desirable that they should be rendered Compulsory by Legislation?" The substance of this paper was printed by us last week (see p. 953, vol. xlvi.).

After a few remarks from Mr. F. S. Powell, in which he expressed grave apprehensions as to the system adopted in the building of lodging-houses in London,

Mr. Boord, steward to the Duke of Bedford, moved a vote of thanks to Mr. Collins for his very able paper. The question of housing the people was one of great importance to the inhabitants of the metropolis, and every effort should be made to get rid of unsanitary dwellings, and to put a stop to the practice of overcrowding. As regarded lofty houses he agreed with the observations of Mr. Collins, and he must say he had viewed with much concern the disposition to raise such buildings without sufficient areas around them. Instead of being a benefit to the working-classes he was afraid these lofty buildings were likely to prove a curse. He doubted the necessity of crowding particular neighbourhoods with artisans' dwellings, because he thought that many of the trades carried on in London could be as well removed into the country, or, at least, into the suburbs. If they ensured workmen and workwomen employment in their trades they would readily follow their employers into the country. Until we could educate the people properly in sanitary matters we must compel them to act up to the law.

Mr. Stanley Bird mentioned instances in which cesspools had been found under houses in excavating for the foundations, and urged that there was a great necessity for compulsory legislation. While speaking with all respect of sanitary engineers, he thought there was too strong a tendency amongst some of them to expend their energies in the invention of traps and such like appliances which should be connected with their names as the inventors.

Mr. Arnold spoke of the deficiency of powers to provide for efficient ventilation.

Mr. Craig thought it was very desirable that Parliament should appoint a Minister of Health.

Mr. J. H. Bridges, M.B., was then called upon to read a paper, the subject of which was, "What, if any, restrictions in the interests of health should be enforced in connexion with the employment of girls and women in workshops and factories?" He pointed out that the most important extensions of factory legislation that had been proposed were:—1. Restriction on the employment of mothers, namely, that it should be illegal to employ them for a period of six weeks after childbirth. 2. Extension of the Workshops Act to domestic occupations. 3. Extensions of it to various wandering occupations; as to chimney-sweepers (already under special, but possibly insufficient control), errand boys, street performers and musicians, newsboys, match-sellers, &c. 4. Restriction of hours of labour in retail shops. It was evident that a strong case might be made out in favour of each of these proposals. The arguments in favour of the first was obvious. It was admitted that women in Lancashire frequently returned to work within a few days of their confinement. When they remembered that work with these women meant incessant watching of four looms, through each of which the shuttle passed three times a second for ten hours a day, and that during those ten hours they could never once sit down, every one might imagine, though no one but a medical man could fully appreciate, the enormous, the atrocious, imprudence of such an act as this. In view of the inevitable miserable consequences, the question was, should women be protected in this matter from the pressure put upon them, sometimes by brutal and drunken husbands, sometimes by stupid and greedy overlookers? Should their freedom of returning to work be curtailed by

law? Should it be an offence knowingly to employ any woman within six weeks of childbirth? This prohibition had been enacted in Austria, and, he believed, in Switzerland. After considering the arguments for and against, he had come to the conclusion that a case was made out for legal prohibition. The second change he would advocate was the assimilation of factories, so far as sanitary inspection was concerned to workshops,—that was to say, their subjection to the Health Authority of the district, whose officer should be instructed to visit them, in the ordinary discharge of his duty, and not, as at present, on the special invitation of the Inspector of Factories. Those two changes excepted, he had but little hope for the remedy of the grievous evils connected with the condition of women in workshops, and above all the domestic workshops, from a further extension of minute inspectorial supervision. The real and practical remedy for the evils complained of would seem to be an organised concentration of public opinion on the condition of low-paid labouresses, such as would lead a skilled workman to refrain from ordering his clothes at a slop-shop, or a fashionable lady from changing her fashion rapidly, or ordering her dress in a hurry. He did not despair of a time arriving when through the wide diffusion of sound principles on this matter, the skilled mechanic and the rich lady, and every one of them rich and poor, would be restrained by the unwritten law of conscience from purchasing any article for which there was reason to believe that the maker of it had not been duly paid, or had been unduly worked.

The Chairman having invited discussion,

Mr. John Arnold wished to remark, on behalf of the very unfortunate class of girls who worked in drapers' shops, whose case had not been touched upon by Mr. Bridges, that the hours these girls were employed, frequently in close and unhealthy shops, were excessive, and the girls were on their feet all day long.

Mr. Edwin Chadwick said it had been proved that there was nothing gained by the long hours of work in the factories of Lancashire, and he thought workshops should be visited once a week by medical officers of health.

Professor de Chaumont observed that it appeared to be thought by some that legislation was the panacea for all evils. He sympathised with the overworked girls and women in shops whose hardships had been referred to by Mr. Arnold, but the difficulty of applying legislation to their cases was very great.

After a few words from the Chairman the meeting adjourned.

At the second meeting of the Conference, held on Friday, the 27th, Sir Richard Temple again presiding, papers were read by Mr. G. W. Hastings, M.P., entitled, "Is it desirable that Notification of Infectious Disease should be Obligatory?"; and by Mr. A. H. Brown, M.P., on "Is it desirable to Legislate further respecting the Duties of Medical Officers of Health?"

Mr. Hastings, M.P., in the course of his paper, observed that the question of making notification of infectious diseases was first brought forward in a paper read at Brighton in the year 1875, and since that time, in thirty-eight towns, some system of compulsory notification had been adopted, while during the present session several others would receive similar powers. It was, therefore, too late to say that notification should not be made obligatory because the results could not be foreseen. The real question was whether notification should be made universal, aud if so, under what conditions? He might mention the case of Edinburgh, where the system was in force, and had been attended with the most satisfactory results. The duty of giving notice of the existence of infectious disease there devolved on the medical attendant, and no objection had been raised to it. Dr. Littlejohn, the Medical Officer of Health of Edinburgh, had reported that from the year 1879, when the system was introduced, up to the end of 1883, he had received notifications to the number of 21,710, of the existence of typhus, typhoid, diphtheria, scarlatina, and small-pox. Notification had been attended with the happiest consequences in checking the spread of those diseases. Similar testimony had been given by medical officers in other towns, and as applications for compulsory powers were constantly coming forward, it seemed desirable that a general Act should be passed enabling every town or district to apply such measures without having to go to the expense of a special Act of Parliament.

Mr. James Bailey and Mr. William Young both protested against compulsory notification as an interference with the liberty of the subject.

Alderman Pollard, of Halifax, remarked that compulsory legislation in the matter of infectious diseases had been in force in that town for two years, and he was convinced that it had been the means of saving many lives. He believed the death-rate arising from zymotic diseases was lower in Halifax than in any of the large towns the returns of which had been published by the Registrar-General.

Dr. Dudfield also strongly advocated the adoption of compulsory notification of infectious diseases.

Dr. Wallace, of Greenock, expressed the opinion that without compulsory notification they would not be able to do very much in the way of preventing the spread of infectious diseases. He had not the slightest doubt that the mortality of all towns or districts would be greatly diminished by the adoption of compulsory notification by medical men.

Prof. de Chaumont thought the objections urged against compulsory legislation on this question were not well founded. There was no doubt that such legislation was necessary, but great care and tact must be exercised in bringing compulsory notification into general practice. He was as great an advocate of the liberty of the subject as any one, but he could not understand how opposition to a measure having for its object the prevention of the spread of infectious diseases, could be maintained on that ground. He wished to get rid of the idea that this movement for official notification was got up for the aggrandisement of the medical profession, for the small fees that were charged were not likely to be a great temptation.

Mr. Hastings, in the course of his reply, said this was a question which chiefly affected the poor, and he did not understand that "liberty of the subject" which would allow disease and death to go on unchecked. He had heard the objection as to the interference with the liberty of the subject brought forward in the House of Commons, and there was, in fact, no nonsense too great to be talked in that assembly of the collective wisdom of the nation, simply because the members would not take the trouble to acquaint themselves with the real facts.

Mr. A. H. Brown, M.P., then read his paper, in which he discussed the question, "Is it desirable to legislate further respecting the duties of Medical Officers of Health?" The various conclusions which Mr. Brown arrived at in his paper may be summed up as follows:—First, that combined districts, giving large areas to medical officers, were advisable; secondly, that the areas should be of such a size and population as to occupy the whole time of a medical officer in his public duties, and therefore he should not have a private practice; thirdly, that the medical officer should be approved by the Local Government Board, because it made him more independent for the term of his appointment; and the term of his appointment should be lengthened. With regard to this latter point, the Local Government Board, in their twelfth annual report, made the remark that hitherto it had been the practice to appoint the officers employed for single districts for short terms, usually not exceeding two or three years; but with the experience which had been gained, since the passing of the Public Health Act of 1872, of the nature and the extent of the duties devolving upon those officers, it appeared to the Board that under certain circumstances they might now not improperly assent to a somewhat more extended term of office. Fourthly, that it was not advisable to give medical officers any independent authority, nor was it advisable to give them any power of appeal from the Local Boards either to any proposed new authority, or to the Local Government Board; fifthly, that the principle of making the medical officer of health a county officer and paying him out of the county rates, would not get over the difficulty, for any expenditure for sanitary purposes must be local expenditure, and would be opposed on the same grounds as now. Finally, that the best means of promoting sanitary improvement and awakening Local Boards to their duties, was by the force of public opinion, by public discussion, and by conferences similar to the present.

In the course of the discussion which followed,

Mr. E. Chadwick remarked that Mr. Brown had rendered good service in the cause of sanitation, and he hoped he would continue his exertions in the cause.

Dr. Saunders was of opinion that until medical officers of health felt themselves secure in their appointments, and that they could not be arbitrarily discharged, their hands could not be so strong in the performance of their duties as they ought to be.

Dr. Wallace corroborated the view expressed by the last speaker as to the necessity of security of tenure in their appointments as medical officers. They ought to feel that they could not be removed except by the Secretary of State. It was absurd that in a large town or city a medical officer of health should be liable to removal at the caprice of a local body elected annually. One of the greatest difficulties medical officers had to contend with was the securing of healthy homes for the working classes.

Mr. Dudfield was of opinion that medical officers required to use discretion in putting in force the powers which they possessed, but he thought it absurd that there should be so many defects in sanitary arrangements, while there were such powers as at present existed for their removal.

Mr. Brown, in replying on the discussion, observed that some local Boards did their duty very well, but he must say that in many instances they did not properly support their medical officers of health in the matter of sanitation. He was quite of opinion that the term of appointment should be lengthened, and that medical officers of health should not be liable to removal, except by the Local Government Board. They would thus become more independent, and their opinions would have more force. It appeared, from a paper supplied by the Local Government Board, that out of 577 Rural Sanitary Authorities, the medical officers of 527 were paid by Parliament to the extent of one-half their salaries, and with the condition that they could not be removed by their Local Boards for the term of their appointment except with the consent of the Local Government Board. There were 947 Urban authorities, and the same remark applied to the medical officers of health of 579 of them. It would be understood that these last figures were the number of authorities, not the number of medical officers; for one officer often superintended several districts.

The Chairman, in closing the discussion, observed that the papers read had been written with remarkable ability, and were inspired by humane and enlightened principles. He trusted the result of the Conferences would be satisfactory, not only to those of the public who were interested in sanitary matters, but to the officials of the National Association for the Promotion of Social Science, under whose auspices the Conferences had been held.

On the motion of Mr. Edwin Chadwick, a vote of thanks was accorded to the President, who briefly acknowledged the compliment, and the proceedings terminated.

ARTISTIC TAPESTRY PAINTING.

MR. EDOUARD RISCHGITZ, of 42, Lindengardens, W., has opened what purports to be the first English Exhibition of Painted Tapestries. The quality which a painting upon any textile fabric must have to make it worth the attention of those who look for a principle when they set about decoration is permanence. And this quality Mr. Rischgitz claims for his work. The "Compagnie des Peintures artistiques" who exhibited their work in London two or three years back were the first to discover this secret of giving absolute permanence to paintings executed upon woollen or animal fabrics (on a vegetable fabric it is said this cannot be done). But the secret of the "Compagnie des Peintures artistiques" rests with them, and Mr. Rischgitz has had to discover his method for himself. In all painting of this kind acid is used with the colours. This acid must afterwards be removed by a process which gives, at the same time, fixity to the painting,—a process which, by way of analogy only, may be compared with that of firing in china-painting. Mr. Rischgitz's painted tapestry will wash, and, generally speaking, may be submitted to any cleaning process not injurious to the fabric itself. It thus appears to be a genuine and legitimate industry, and not to be ranked in

the same class with the painted teapot cosies, *et hoc genus omne*,—a false fashion for which gives occupation to many fair idle hands. Mr. Rischgitz occupies the house which belonged once to Creswick, the painter, and his tapestries are shown in a room known as "Creswick's gallery." It may be remarked that this new work finds favour with Mr. Walter Crane, some of whose work is exhibited. Specimens also are to be seen of tasteful painting by Mr. Hamilton Jackson, Mrs. Sparkes, and others.

EXHIBITION OF OLD SILVER, &c., IN AID OF THE GIRLS' FRIENDLY SOCIETY.

WE do not know what precisely the "Girls' Friendly Society" may be, but a very beautiful little exhibition has been held during four days of this week with the humane intention of helping it. No catalogue of the various articles was published, except of that part of it which belongs to the Rev. J. C. Jackson, M.A. But the committee were fortunate in securing the aid of so good an authority as Mr. Cripps in arranging and labelling the collection. There are few things nowadays the history of which has not been made a special study, and been told at least once in a heavy book. Clocks and watches are no exception to the rule.

The first "practicable" watch, as they say on the stage, was made at Nuremberg, in 1490, by Peter Hell. Henry VIII., we are told, had a watch that would go for a week; and in the time of Elizabeth watches were in common use. They had no glasses, and the cases were ornamented with exquisite open metal-work. It will be a great pity if any who are curious concerning the history of what sometimes are profanely called "warming pans" should have missed this choice exhibition. A new industry has arisen which bids fair—so far at least as their works are concerned—to destroy all the old watches in the land. Not only the cases, but the interiors of these old timepieces also present exquisite specimens of the metal-workers craft. And some enterprising jewellers, of whom Mr. Cox, of Southampton-row, is the chief, have created a trade in these antique wheel-guards, &c., which, when dragged from their obscure position, are made into necklets and bracelets, and breast pins, and make highly effective and beautiful ornaments. But the watches in Cadogan-square have suffered no such indignity. There were the grand old silver ones, some of very early date, enormous in size, and covered with delicate open-work; ladies' watches of later date, gorgeously bediamonded and enamelled, —as many varieties of watches, in short, as in "Hameln town" there were of rats. All periods were represented, and doubtless all the most eminent makers, from Andreas Heinlein and Limpard in the sixteenth, to Lépuie and Berthoud in the eighteenth century.

OFFICIAL VISIT TO THE CHISWICK PUMPING STATION.

SOME of the members of the Select Committee of the House of Commons on the Lower Thames Valley Drainage Bill visited the Chiswick Pumping Station on Saturday last, in view of the circumstance that these works are to a considerable extent on the same principle as that on which it is proposed to erect the larger Thames Valley works at Mortlake, viz., the precipitation by means of lime and sulphate of alumina. The deputation consisted of Mr. Giles, the chairman of the Committee; Viscount Folkestone, Mr. Gathorne Hardy; and there were also present Mr. Mansergh, the engineer of the Thames Valley scheme; Sir Thomas Nelson, chairman of the Lower Thames Valley Sewerage Board; Mr. Herbert Currey, solicitor to the Duke of Devonshire; Mr. Henry Currey, surveyor to his Grace; Mr. Stileman, consulting engineer to his Grace; Mr. Lewis Coward, counsel for the Richmond Select Vestry; Mr. C. J. Moore, engineer to the Thames Conservancy Board; Mr. Benjamin Hardy, chairman of the Chiswick Local Board; Mr. May, member of that Local Board; Mr. Strachan, surveyor to the Board. The chairman and the surveyor showed the party over the whole of the works, pointing out the defects of and disadvantages under which the works were at present carried on; and also the efforts which were being made to produce a more satisfactory effluent. On the whole, the Committee seemed satisfied with their visit. They inspected the effluent water, and also a sample of the river water; and the general conclusion seemed to be that the effluent was much clearer than the river water. In the event of the Bill passing, care will, of course, be taken to profit by the experience gained at Chiswick; and to remedy that which is not considered perfect there. The Committee were informed of the proposed alterations on the works which had been the subject of a recent inquiry before Major Tulloch, Inspector of the Local Government Board, and it was hoped that the works would, when these were carried, be in as satisfactory a state as could be desired. The conclusions of scientific opinion at present seemed distinctly in favour of the alterations being carried out, which would make the Chiswick works the most perfect of the kind. The improvements, which were decided on after consultation with Dr. Tidy, consist mainly in providing sludge-presses by which the sludge, now lying in large accumulations and giving off offensive odours, will be put, pressed into a dry, portable form in a few hours, and carried off the works; the insertion of an "extractor," to prevent the entrance into the works of solid matters; the better treatment of the chemicals; and a more efficient filtration through coke. The Committee seemed to consider that these works were the most important which they would be called upon to see during the inquiry.

SLUDGE DISPOSAL AT WIMBLEDON.

ON Tuesday, the 17th ult., an inquiry was held at Wimbledon by Mr. Arnold Taylor, of the Local Government Board, relative to an application by the Wimbledon Local Board to borrow the sum of 1,800*l.* for the erection of plant for the treatment of the sewage sludge produced at the sewage works.

Detailed plans and an exhaustive report were produced by the engineer to the Board, Mr. W. Santo Crimp, from which it appeared that it was proposed to treat the sludge by means of Johnson & Co.'s filter presses.

The clerk, Mr. W. H. Whitfield, read several pages of the report, from which it appeared that the sludge, amounting to 20 cubic yards daily, is now swept into large open pits formed with ashes, where part of the moisture evaporates and part drains off. A large proportion still remained, and ashes were added, to render the sloppy mass sufficiently solid to cart on to the land, where it was spread and ploughed in. The system was, however, costly and unsatisfactory. In the proposed scheme, the sludge would be swept into a large underground reservoir, whence it would gravitate into large iron receivers in the machinery house, and then air pressure would be employed to force the sludge into the presses, and, with a pressure of 100 lb. per inch, force out the water, leaving cakes containing 50 per cent. of moisture, which could be easily disposed of. The 20 yards of sludge produced daily weighed about 15 tons, of which 90 per cent. is water, or in 15 tons of sludge there are but 1·5 tons of solid. As 50 per cent. of the cakes were water it followed that 3 tons of cakes would be the daily produce, thus reducing the weight and bulk enormously, and avoiding any chance of a nuisance.

The proposed works are somewhat similar to those carried out at Merton by Mr. Crimp, under Mr. Baldwin Latham, M. Inst. C.E., which have been in succesful operation for over two years.

ARCHÆOLOGICAL SOCIETIES.

Lancashire and Cheshire Antiquarian Society. On the 28th ult. about fifty members of this Society, accompanied by a few ladies, visited Lancaster. The party first visited the castle, where they were shown the assize courts, the ancient dungeons, the famous gateway tower built by Henry V., &c. The party afterwards ascended to the top of the Norman keep, or "John O'Gaunt's chair," whence a splendid view of the Lake Mountains was obtained. The ancient parish church of St. Mary was next visited, and its details described by Mr. Paley, F.R.I.B.A. This church is a fine specimen of the Perpendicular period, and has at the east end some elaborately-carved and traceried old oak screens. The church is also remarkable for having a chancel of equal length with the nave. The party then adjourned to the County Hall, where they had lunch, and afterwards took train for Morcambe, driving thence in wagonettes to Heysham, where the rector, the Rev. C. T. Royds, showed them over the ancient Norman church at that place. The return to Lancaster was made all the way by wagonette, the town being reached shortly before half-past six. An adjournment was then made to the Amicable Library, where several old charters of the town, the municipal regalia, and a few Roman antiquities found in the neighbourhood were here displayed.

Berks Archæological and Architectural Society. This society is offering prizes for historical essays, on subjects having reference to the county of Berks, and also for architectural drawings, illustrating ancient buildings in the county. The competition is open to all students of architecture, and scholars of Elementary, First Grade, and Science and Art Schools, under the age of twenty-five, residing in the county. Intending competitors should apply at once to the Rev. J. M. Guilding, St. Lawrence's Vicarage, Reading, for particulars as to the historical essays; and to Mr. Slingsby Stallwood, Friar-street, Reading, as to the architectural drawings competition.

MASTERS AND MEN.

The Slate Trade in North Wales.—It is stated that the Council of the North Wales Quarrymen's Union intend to issue a circular to the various quarry owners in Carnarvonshire and Merionethshire urging them to convene a meeting for the consideration of the existing stagnation in the slate district.

Tyneside Joiners.—There was held on Saturday afternoon, a mass meeting of joiners in the Ellison-street Presbyterian Lecture Hall, Jarrow. The number present was about 100. The question for the consideration of those present, as stated by the delegates, was whether the men should agree to the threatened reduction of 2s. a week in their wages, which are at present 32s. The notice of reduction takes effect on the 10th inst. The meeting, which lasted two hours, decided, by the unanimous vote of those present, to agree to a motion offering resistance, on the ground that the state of trade does not justify a reduction of wages. The joiners of North and South Shields held a united meeting on Saturday afternoon, in the Central Hall, Chapter-row, South Shields, and unanimously resolved to resist any further reduction.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE annual meeting of this Association is to be held in Newcastle-on-Tyne on Thursday, Friday, and Saturday next, the 10th, 11th, and 12th of July.

On the first day, Thursday, July 10th at 10.15 a.m., there will be a Council Meeting at the Engineer's Office, Town-hall, Newcastle; at 11 a.m. there will be a reception by the Mayor of Newcastle-on-Tyne, Mr. W. H. Newton; at 11.30 a.m. the annual meeting for the adoption of the report, for the election of officers, and for the transaction of general business, will be held. Several alterations in the rules are proposed. After the business has been disposed of, the President will deliver his address, and a paper will be read (should time permit) on "Inspecting and Testing the Sanitary Arrangements of Houses," by Mr. J. B. Spencer, A.M.I.C.E., F.R.S., of Newcastle-on-Tyne. In the afternoon the members will visit various places of interest in the town. The annual dinner will take place at the County Hotel, Neville-street, Newcastle, at 6.30 p.m.

On the second day, Friday, July 11th, the members will meet at the Council Chamber, at 10 a.m., for the reading and discussion of papers. The following papers are set down for reading, viz., "Steam on Tramways," by Mr. Jas. Hall, Borough Surveyor, Stockton-on-Tees; "Sewage Disposal," by Lieut.-Col. Jones, V.C., Wrexham; "The Cost of Local Government and the Distribution of the Funds," by Mr. F. S. Brunton, Assoc.-M. Inst. C.E., Richmond. In the afternoon a visit will be paid to the Elswick Ordnance and Engine Works; the Swan and Edison Electric Light Company's factory at Benwell; and the Elswick Colliery.

On the third day, Saturday, July 12th, members will assemble at 10.30 a.m. in the Council Chamber for the closing business of the meeting; and at 11 a.m. the Tyne Commissioners' steamer, *J. C. Stevenson*, will leave the Corporation Fish Quay to go down the river, calling on the way at the Corporation Cattle Lairs, St. Laurence; Messrs. Walter Scott & Co.'s Cement Works; the Tyne Commissioners' Yard at Howdon; the Whitehill Point Coal Staithes; the New Coble Dene Dock Works; and the Piers at Tynemouth.

THE NEW RAILWAY REGULATION BILL.

SIR,—The Railway Regulation Acts Amendment Bill, which was reviewed in such an able manner in your issue of June 21st, is meeting with a reception which must be very disappointing to the author, especially when it is considered how much adverse criticism has been passed upon his other effort,—the Shipping Bill. Associations naturally antagonistic to each other consider it necessary to treat the Bill with uncompromising hostility unless considerably modified, and, as any concession to either party would intensify the opposition of the other, the unfortunate measure seems doomed to failure. Besides the unsatisfactory "Terminals" clause, that relating to "Appeal" is viewed with great distrust by the traders. The power of appeal under the Act of 1873 is only upon questions of law, and the party aggrieved has to apply to the Railway Commissioners to state a case. The proposed legislation greatly extends the principle of appeal, as either party may appeal (by leave) from any decision of the Commissioners, the appeal to be brought by notice of motion only, no case or formal proceeding being necessary. This, in the opinion of the Traders' Association, lessens the value of the Commissioners, as the feeling of uncertainty as to the conclusive nature of their decisions would keep the public from bringing cases before them. The Registrar to the Commissioners (Mr. Balfour Browne) makes the following remark in his work on "The Practice before the Railway Commissioners":—"The Legislature had determined to make one more effort to counteract the evil effects of the practical monopoly which had been acquired by railway companies. It determined to encourage the public to complain of the unjust use by railway companies of the great powers which they had obtained, and which were not covenanted for by Parliament."

The present measure seems in this respect to be retrogressive, and to discourage the public from complaining, it being notorious that the railway companies, relying on the power of a long purse, will take a case from court to court, however small their chance of success may be. This leads to a remark on the *locus standi* of Chambers, &c. The new Bill provides that Chambers of Commerce and Agriculture may bring before the Commissioners any complaint of contravention of the Railway Regulation Acts without proof that the complainants are aggrieved by the contravention. This gives the trader the benefit of the "long purse" of the association, while there is no risk of action for maintenance, and is one of the most useful sections of the Bill.

You have remarked upon certain evidences of the hasty way in which the Bill was framed, and another proof of this is to be found in the Appeal Clause. The wording of the clause seems to leave no room for doubt that appeal is to be allowed upon questions of fact; but Mr. Chamberlain has intimated that this is not the construction he intended should be put upon the clause.

It is clear that the legalisation of terminal charges that have not at present received Parliamentary sanction is held out to the companies as an inducement for them to revise their classifications of rates. Every builder and contractor knows that however nearly he may be able to estimate the cost of materials, it is a matter of great difficulty to estimate the cost of carriage. Of course, now that the Act of 1883 has opened the rate-books of the railway companies to public inspection, the rates to or from any particular place are soon ascertained; but there is such a lack of consistency or uniformity about them that it is useless to attempt to estimate cost of carriage to any point by any means you may have at hand,—such as rates to another place of about equal distance,—and the railway rate-book must be consulted in every case or you may fall into a serious error. This should not be, but, unfortunately, the powers conferred upon the companies by Parliament in this respect are so indefinite, and vary so much in the case of different companies, that it is almost impossible to understand how the rates are arrived at. The amount charged for terminals is most uncertain, and it will be seen on referring to the section just quoted that the companies have great discretion in the matter, and are only answerable for their charge in the event of a complaint being made to the Commissioners. At the same time, before they can obtain Parliamentary sanction for these charges, they must first submit revised rates.

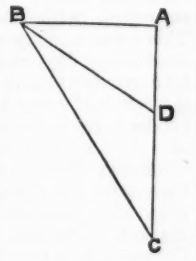
The application of the rules by which the railway companies profess to deal with this subject is at present governed by various circumstances, and they are frequently considerably modified. It seems that there is reason to fear that the companies might obtain sanction in some cases for higher sums than they have hitherto been charging, and, by enforcing their new powers, advance some of the rates. Mr. Chamberlain, however, does not anticipate any such danger. He told a deputation, who waited upon him on June 19th, that he did not consider it fair to assume that the legalised terminals would press unduly upon the traders, as the question would be decided by a tribunal having all due consideration for their claims.

The sections dealing with the permanent appointment of the Commissioners, the transferring to them of all railway questions, and the *locus standi* clause already referred to, are useful and satisfactory. There are also clauses having in view the reduction of the number of preventible accidents and improvement in the punctuality of the trains, which, if not of much importance, are still evidences that the Bill is intended to benefit the public generally. These clauses were vigorously protested against by a deputation representing the railway companies, who had an interview with Mr. Chamberlain on the 20th of June. Lord Brabourne and his Shareholders' Association show great hostility to the Bill, and though their opposition, as expressed at the meeting of the 5th of June, did not appear very clear or intelligent, it is evident they are prejudiced against *any* legislation of this kind. But it has been so loudly called for that it seems rather a pity that it should meet with such hostility from all interests involved, as this must have the effect of discouraging legislation. In fact, Mr. Chamberlain stated on the 19th of June that if there was anything like concerted opposition from the traders or the railway companies, he could not hold out any sanguine hope that the matter would be proceeded with during the present session. It was only with a general assent to the principle of the Bill, and a general willingness to have the details further considered in Grand Committee, that it would be possible for him to give the time which would be necessary to carry the second reading, and pass the Bill on to committee. It was immediately prophesied by a portion of the press that the Bill would fall to the ground; and, considering the pressure of business in the House, this does not seem at all unlikely, and if the Bill is rejected, it will probably be a long while before any legislator will venture to frame another, and the railway problem will be as far from solution as ever.

F. C.

ENGINEER'S FORMULA.

SIR,—In your issue of June 14, "Engineer" asks the readers of the *Builder* to solve a certain dynamical problem. As his request has at present elicited no reply I venture to offer the following solution. Let A and B be the two points respectively, AC the vertical line through which the body will fall, and let D be the position of the body after the first unit of time; also let C be its position at any instant of time (x). Now, by the law of gravity the length of the line AC will vary as the square of the time (x), and therefore the value of tan. ABC at any instant of time will be x^2 tan. ABD.



Put $y = ABC$, and let c = tan. ABD,
then tan. $y = c\,x^2$,
and y = tan. $^{-1}\,c\,x^2$; differentiating this expression we have $\frac{dy}{dx} = \frac{2\,c\,x}{1 + c^2\,x^4}$ This last expression is the differential co-efficient of the angle ABC, with respect to the time (x), and when the body is moving with its greatest angular velocity, as seen from the point B, the expression will be a maximum.

Put $z = \frac{2\,c\,x}{1 + c^2\,x^4}$ and differentiate thus:—

$$\frac{dz}{dx} = \frac{2\,c(1 + c^2\,x^4) - 8\,c^3\,x^4}{(1 + c^2\,x^4)^2}$$

$$= \frac{2c(1 - 3\,c^2\,x^4)}{(1 + c^2\,x^4)^2}$$

By equating this expression to zero we find $cx^2 = \sqrt{\frac{1}{3}}$. Thus, tan. $ABC = \sqrt{\frac{1}{3}}$, when the body is moving with its greatest angular velocity as seen from the point B; and, therefore, the required distance = $17\sqrt{\frac{1}{3}} = 9{\cdot}81496$ ft.

J. G. V.

PROVINCIAL NEWS.

Manchester.—Additions to Henshaw's Blind Asylum, Manchester, have recently been put in hand. The new works, which are costing 3,355*l.*, comprise gymnasium, workshop, girls' play-room, hall for the servants, and various sanitary improvements. Mr. Charles Heathcote, Manchester, is the architect, and Messrs. Wilson, Toft, & Huntley, are the builders.

Guildford.—The Surrey Art Loan Exhibition, opened a few days ago in the County and Borough Halls, Guildford, is reported to be very rich in specimens of paintings, especially portraits, by the old masters, contributed by county families. Among these are works by Ghirlandajo, Lorenzo di Credi, Correggio ("Venus" and "Ecce Homo"), Bonifazio, Zucchero (Queen Elizabeth with four councillors), Holbein, Rubens, Vandyck, Hogarth, Vandevelde, and Albert Dürer, besides copies of masterpieces by Vandyck, Raffaelle, and Titian. The Exhibition will remain open for several weeks.

Pangbourne.—An Art Exhibition was opened on the 23rd ult. at Pangbourne. The Exhibition, which will remain open until the middle of September, is intended to elevate and instruct the artistic tastes of the people of Pangbourne and the neighbourhood, and at the same time to afford additional attraction to the numerous visitors who, during the summer, throng that delightful Thames-side village. The idea, which originated with Miss L. Hopkins, daughter of Mr. R. J. Hopkins, of Tidmarsh Manor (the president of the Exhibition), has been admirably carried out in every detail by that lady and her sister, assisted by several gentlemen; and, no doubt, their well-intentioned and spirited enterprise will be appreciated as it deserves, and rewarded by a large attendance. Mr. Dendy Sadler is among the artists whose work is represented.

Wolverhampton.—A series of reports with reference to the Wolverhampton sewerage, which is becoming a question of pressing importance, has just been issued to the members of the Town Council by the Sewerage Committee of that body. Some time ago Mr. Edward Pritchard, C.E., of Westminster, prepared a report on this subject, dealing not only with the sewered portion of the town and the sewage farm at Barnhurst, but with the unsewered area on the southern side of the borough. Mr. Pritchard then estimated that in order to deal with the increasing quantity of sewage which had found its way to Barnhurst, it would be necessary to provide further works at a cost of 22,500*l.*, and that an additional sum of 21,600*l.* would be required to lay down a separate system for the unsewered portion of the town. In April last Mr. Pritchard presented another report to the committee with respect to the sewerage of the Rough Hills and surrounding district, which he estimates will cost 3,600*l.* Mr. G. E. Thoms, the Borough Engineer, in a report upon Mr. Pritchard's scheme, suggests that the sewerage for the Smethwick portion of the town should be carried to Highgate-common, a distance of nine miles, instead of to Pool Hall farm, where he believed the sewage could be better dealt with, owing to the land being more suitable for the purpose. This scheme, or as much of it as will be required for some years, he thinks, can be carried out at a cost of 63,400*l.*, which is 3,400*l.* less than Mr. Pritchard's estimate. In order to ascertain what system is most suitable for the borough of Wolverhampton, the Sewerage Committee intend visiting a number of the more important towns in the kingdom to inspect the sewerage works in operation. Leicester and Birmingham have already been visited.

Water Supply. — The Strand Board of Guardians, finding the water supplied by the New River Company to their workhouse at Edmonton is costing near 300*l.* per year, have instructed Mr. W. Brown, artesian well engineer, of Tottenham, to make a new well, 415 ft. deep. The work to be carried out under the direction of Mr. W. S. Cross, of 18, Outer Temple, Strand.

CHURCH BUILDING NEWS.

Mevagissey.—A meeting has been held to consider proposals for the restoration of the parish church, which the vicar describes to be in so dilapidated a condition that it is in danger of being blown down. An effort was made for obtaining funds for the work some eight years ago, but unsuccessfully. It is stated in a local paper that plans and specifications were then obtained from Mr. St. Aubyn, architect, and Mr. Henderson offered to restore the body of the church for 1,000*l.*, erect a tower for 200*l.*, and extend the chancel for 100*l.* Total, 1,300*l.*

Bromley Common.— Holy Trinity Church, Bromley Common, was re-opened and a new apse consecrated by the Archbishop of Canterbury, on the 23rd ult., after having been closed during restoration. The old building was erected about forty years ago, and was built on a very awkward plan, having a very shallow chancel, no organ-chamber, and inadequate heating apparatus. The present additions consist of an apse giving greater depth to the chancel, an organ-chamber with space underneath for Grundy's hot-air apparatus, choir-stalls, an oak and stone pulpit, &c., the chancel being raised above the level of the nave floor, and projecting into the body of the church. New seating in pitch-pine has been substituted in place of the old straight-backed pews. These improvements were carried out in memory of the late Mr. George Warde Norman by his family, and a memorial tracery window of four lights, filled with stained glass by Messrs. Clayton & Bell, has been put in by the children of the late Mr. Henry Norman. The total cost of the restoration, including an organ by Mr. Henry Jones, of the Fulham-road, will be under 2,000*l.* Mr. William Smith, of Bromley Common, was the builder employed, under the direction of Mr. C. Pemberton Leach, architect, 31, Spring-gardens.

St. Stephen's-by-Launceston. — The ancient parish church, dedicated to St. Stephen, at St. Stephen's, near Launceston, has for some time been in the hands of the restorers. St. Stephen's is the mother church of Launceston. The church stands upon high ground, and consists in plan of a nave, north and south aisles, chancel, north transept, and a south porch with parvise and tower. The edifice is generally of grey granite, but polyphant, the beautiful soft finely-grained stone of the district, has been largely introduced into the new masonry. The restoration of the church has long been felt to be most desirable, and at length the task was entrusted to Messrs. Hine & Odgers, architects, Plymouth. From the plans of these gentlemen the work is being carried out by Mr. Henry Burt, builder, of Newport, Launceston. The new roofs assume the ancient wagon type so prevalent in the West. They are covered with lead outside, and within are of pitch-pine, and enriched by carved oak bosses. The stalls are of oak, and have sculptured angels in attitudes of adoration carved upon their ends. These are by Mr. Harry Hems, of Exeter, who has also done the carving appertaining to the new roofs. The new Perpendicular windows are of polyphant stone, and are glazed with cathedral-tinted glass. The plastering has been stripped off the walls, and these are now neatly pointed. There is no pulpit and no seating in the body of the sacred edifice. It is the intention to use chairs,—at least for the present. An exceedingly handsome feature in the chancel is the new reredos, which is erected immediately under the east window. It is, in the main, of Bath stone with polished Devonshire marble columns. The sculpture is of Caen stone. The crowning feature is a high crocketted gable springing from supporting and pinnacled buttresses, whilst at either side are three panels, containing fleurs-de-lis, and surmounted by a cornice of carved worked and pierced masonry. The central panel contains a sculptured representation of the Crucifixion, each figure in the group standing out in high relief. This is also the work of Mr. Harry Hems.

Newcastle-on-Tyne. — A new church, to be called St. Jude's, is to be built in the district of Shieldfield, Newcastle-on-Tyne. Mr. Arthur B. Plummer, A.R.I.B.A., Newcastle, has been appointed the architect.

Gateshead.—On the 27th ult., the ceremony of laying foundation stones of the Church of the Venerable Bede, at Sunderland-road, Gateshead, was performed by Mrs. Edward Joicey and (in the absence of Lady James) by Sir Walter James. St. Bede's is one of three churches to be built under the Gateshead Church Extension Scheme, which provides for the erection of between twenty and thirty new churches throughout the diocese. The general arrangement of the new church, the contract for the erection of which has been let to Mr. Alexander Thompson, is in the form of a Latin cross, and consists of a nave, north and south transepts, chancel, vestry, and organ-chamber. The nave is 29 ft. wide and 89 ft. 6 in. long; the north transept, 32 ft. 6 in. by 17 ft. 6 in.; the south transept, 32 ft. 6 in. by 20 ft.; the choir and sacrarium, 32 ft. by 24 ft.; the vestry, 19 ft. 6 in. by 13 ft. 6 in.; the organ-chamber, 18 ft. by 13 ft.; and the north porch, 14 ft. 6 in. by 19 ft. As there are no aisles, and consequently no nave arcade, every one will be able to see the preacher. The entrance doors will open outwards, and the whole of the walls will be built of stone, faced with sneck walling, the thicknesses of the walls being based upon the scale of dimensions required by the Ecclesiastical Commissioners. When finished, the building will accommodate 624 adults. The cost will be 5*l.* a sitting. Messrs. Oliver & Leeson are the architects.

STAINED GLASS.

Westminster Abbey.—At a meeting held last week in the hall of the Institution of Civil Engineers it was decided to erect in Westminster Abbey a memorial window to the late Sir W. Siemens. It was resolved, in order that the tribute should be of a truly representative character, to limit the amount of subscription to 1*l.* 1s. from each person. An executive committee was appointed, consisting of the president and two members of each of the five societies represented at the meeting. Mr. James Forrest was appointed secretary and treasurer.

Paramatta.—There have been placed in position in the eastern wall of St. Patrick's Church, Paramatta (says the Cumberland *Mercury*), three stained glass windows, presented by Mr. T. H. Rawlings, as a tribute to the memory of the ability, zeal, and worth of the late prelate of the Catholic Church, Archbishop Vaughan, The design,—by the donor,—has been faithfully and tastefully executed by Messrs. Ashwin & Falconer, of Sydney. It embraces full-size representations of St. Benedict, in the habit of his order; the Crucifixion,—showing at the foot of the cross, in group, St. John, the Virgin Mary, Mary Magdalene, and St. Thomas.

Columbia Market.—According to Mr. David Scott, of 94, Commercial-street, E., this costly gift to the East End of London has a more fortunate career before it than for a long time, seemed probable. Mr. Scott, in a letter to the *Morning Post*, writes:—"Six months ago the fruit and vegetable department of this market was opened by the twenty-six salesmen who were compelled by law to remove from the Great Eastern Railway Depôt at Bishopsgate to Columbia Market, and it is not too much to say that the efforts of the salesmen have been rewarded with the most complete success. This once unlucky place is growing in importance every day, and would grow still faster and be a greater means of benefit to food consumers if some half dozen or so of those who send their produce to Spitalfields would avail themselves of the undoubted advantages offered by Columbia Market, relieving themselves of the high tolls and charges and want of accommodation, the prevailing features of Spitalfields Market. The idea of failure in connexion with Columbia is a thing of the past, thanks to the generous liberality of that noble-hearted lady, the Baroness Burdett-Coutts, and the business tact and hearty co-operation of Mr. Burdett-Coutts."

Truro Cathedral. — On Sunday last the Bishop of Truro gave the second portion of an address in St. Paul's Cathedral on the claim that the Truro Cathedral has on the entire country. His lordship stated that unless 15,000*l.* was forthcoming by the beginning of August a beautiful design would be spoilt by having to place a temporary roof on unfinished walls. His lordship urged those who had abundant wealth and every luxury to give, say, an organ, a pulpit, or a reredos, to the cathedral of the west, besides helping to find the 15,000*l.*

The Student's Column.

THOUGH our columns are professedly intended for and addressed to proficients in the artistic and practical branches of the architectural profession, we have always had every desire to give assistance or information to beginners who have asked for it, as not a few have from time to time. It has occurred to us that, without modifying in any way the main character of the literary and critical matter of the *Builder*, we may be able to furnish our younger student readers, those who are commencing the study of the rudiments of architecture and professional practice, with a page or two written especially for them, addressed to those who are only just learning, and not assuming on the part of the young reader the existence of anything more than elementary knowledge of the outlines of the subject.

We propose, in this Students' Column to carry on successive series of short articles on artistic and practical subjects, by various contributors specially qualified to treat such subjects. We have found the idea has excited considerable interest both among some of our old and tried coadjutors, and among others who are offering us their hearty and valued co-operation for the first time in this endeavour to add a specially educational feature to our pages.

By way of beginning at the beginning, we give this week the first of a short series of comprehensive lectures on the study of architecture, going over the characteristics of the various styles and their historic and artistic relation to one another. These lectures, as they may be called, have already in substance been delivered to the students in connexion with a well-known architectural society, some of whom will, perhaps, recognise what they will be glad to have a record of in permanent form; and we could hardly begin better than by giving wider circulation to what has already been found useful and interesting by a small circle of students. These will be succeeded by other series on such subjects as foundations, drainage, wood-work, iron-work, construction generally, and various other subjects connected with the endless interests of professional architectural work.

We may add also that we shall be glad to make this column a medium for answering questions such as young students may often have occasion to ask during the time when they are first brought face to face with the very various problems which the study of architecture suggests.

HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE. I.

MOST buildings, up to the date of what is known as the "Renaissance," three or four centuries ago, are clearly referable, by the evidence of their own appearance, to some particular date and locality. Photography places them, as it were, in our very hands, and the great charm and pleasure to be derived from a study of the History of Architecture lies in the being able to assign such date and locality to any example. The pleasure is, of course, enhanced by visiting the locality and there assigning the date.

A sketching trip, even in our own country, affords a range of several centuries for this interesting amusement, for it really amounts to that, when one holds the threads that give the cue to be followed out.

The Renaissance, which closed up certain recognisable styles of architecture, has, after all, only acted like a finger placed on a drop of quicksilver, and has merely dispersed it into countless smaller drops, making the synthesis a more laborious and more interesting task.

The whole history is like a web, composed, at first, of a few strands into which other strands, from time to time, are woven; and, supposing them to be of different colours, the predominance of any particular colour would indicate the prevalence of a style. Here and

there we should find a blending of several colours, harmonious enough, and in effect as different from those of the component strands as green is from blue or yellow. Other strands will pursue their own course, forming, as it were, a fringe that clings to the edge and forms a pattern of its one colour beautifully varied in texture only, and never mingling with the rest. Another strand of fierce colour will suddenly appear and dart off to permeate the web, and, by its very brightness, absorb its neighbours until they have sufficient energy to reassert themselves and to drive it back.

Now the results of these weavings, as evidenced by the buildings themselves, while they are interesting to the literary student, are far more instructive to the intending practitioner, who will see why certain architectural features have been adopted and improved upon, and perhaps discarded. He need, as a consequence, become no mere archæologist, still less the slave of any one particular style; on the contrary, he will see that beauty is correlative to fitness, and, without making ridiculous attempts at originality, will produce buildings as typical of our time as the most ancient buildings are of theirs. His studies must be started in books, and, as he cannot be always visiting libraries, he will require some general authority constantly at his elbow for reference.

Although there are several excellent handbooks, put into as condensed a form as possible, and moderate in price, it will be worth the student's while to start with Fergusson's "Handbook of Architecture," and to have it bound in one volume. As one turns over the thousand and four pages of this work, the entire range of architectural history, down to the time of the Renaissance, is laid before one; the views are represented by excellent woodcuts; and the plans, sections, and elevations are drawn to uniform scales; while the letter-press is both historical and descriptive. There is only one thing wanting to complete the utility of the book, and that is a date to each illustration. The student can, however, by reading the context, add many of these dates himself, and derive much benefit from the process.

Fergusson's "History of Architecture" is an amplification of the former work, and proportionally more valuable; but the "Handbook," as the one most within the reach of a student's purse, is the work that will be generally referred to.

For those who can read French, Ramée's "Histoire Générale de l'Architecture," in two octavo volumes, will be found a very compendious work, and it is especially valuable on account of the lists of books on the various styles, given at the beginning of each chapter.

Rosengarten's "Handbook of Architectura Styles" is another octavo volume that, in addition to the ancient styles, includes Renaissance and Modern Architecture, and, with larger print and a greater proportion of illustrations, disposes of the whole in 509 pages; that is to say, in the English version edited by Professor Roger Smith. While proving very useful to those who cannot afford to purchase Fergusson's Handbook, it is also a valuable companion to it on account of the many and varied kinds of illustrations contained in it.

Another book, which is likely to be in the hands of students, is Gwilt's "Encyclopædia of Architecture," in which the first 226 pages are devoted to the History of Architecture, besides an appendix on Gothic or Pointed architecture.

Smith & Slater's "Classic Architecture" which was preceded by a work by the first author, and Professor Roger Smith's "Gothic and Renaissance;" these form a pair of useful hand-books, of which a notable feature is the *analysis* of each style.

For those who enjoy ingenious theories, treated by a man possessed of the most varied information and the most consummate skill as a draughtsman, Viollet le Duc's "Habitations of Man in all Ages" will open their eyes to many hitherto obscure forms and features. It has been translated into English by B. Bucknall. This wonderful and indefatigable author's other works will be alluded to in due course.

A book that is frequently referred to as a standard authority is Hope's "Essay on Architecture," the illustrations of which are in outline and bound separately from the text.

Another work which is devoid of all illustrations, excepting a frontispiece, is Freeman's "History of Architecture," devoted, however, chiefly to the honour and glory of Gothic architecture in distinction from previous styles.

Without pretending to exhaust the number of handbooks on the subject, the above will be found accessible to most students, and with the help of larger books, such as Gailhabaud's "Monuments Anciens et Modernes," and the works of d'Agincourt, du Sommerard, &c., will give him a fair notion of the various styles.

Fortunately, in London, we need not trust only to books for our studies, for the British Museum, the South Kensington Museum, the India Museum, and the Architectural Museum in Tufton-street, contain many actual examples and full-sized models of the architecture of all ages, and surely no Architect will begrudge his pupils the time to visit these collections with paper, pencil, and 2-ft. rule in hand.

Groups of two or three students will, by mutual assistance, get through an astonishing amount of measuring in a short time, being careful to *take turns* in *measuring* and *plotting* to scale, and making *perspective* views of the examples, otherwise he who is always plotting will not learn to handle his 2-ft. rule, and he who is always measuring will not realise the appearance of the object laid down in outline; while he who lays down the outline will not appreciate the light and shade of the object.

The Architectural Courts at the Crystal Palace will, to a certain extent, assist the student in realising the actual appearance of the originals; but, after all, there is *nothing* like visiting the originals themselves.

The air, the atmosphere, the smell,—often the dirt,—the people, the sounds, the journey,—all the surroundings of Architecture visited on the spot, exert their influence on the impressions produced by it. It is better to run down to Rochester or to St. Alban's or to Waltham or to Eltham, or to Windsor on a Bank Holiday, and to bring back a sheaf of, perhaps grimy, measured drawings, than to sketch in comfort at the Crystal Palace with a sense of band and buns and coffee pervading the place.

The same remarks are still truer of a week's trip across the Channel, or of a fortnight's trip to, say, Lombardy, or of a month's trip, say, to Greece or Sicily; but the longer the trip the greater the cost, and as the study of the history of architecture must begin at the beginning, and as that beginning is to be found a long way from England, English students must be content to make their first measured drawings from the collections above named.

Now, there are some styles of architecture which, although they cannot be put at the beginning of a consecutive series, like the threads that come to be woven in with other threads in the web, have still a decided colour and texture of their own. These are they which may be said to cling to the edge of the web, forming a fringe. Possibly future discoveries may prove a connexion between them and the consecutive styles; meanwhile, we may follow the example set by Fergusson in his "Handbook of Architecture," and dispose of "Indian," "Chinese," "Japanese," "Mexican," and "Peruvian" architecture as styles exerting no influence upon the other known styles.

NATIVE INDIAN.

Fergusson, in his Handbook, begins with the native architecture of this country, not because it is by any means the most ancient of the known styles, but because the country is such a long way off that the great conquerors of the world could not get at it, and consequently it kept itself to itself, and, with one exception that will be pointed out, the Architecture of its *native religions* neither influenced nor was influenced by the styles of other countries.

In illustration of this separate existence of India it is worth while to study such a book as Keith Johnston's work on "Geography, Physical, Political, and Descriptive," published by Stanford. In it may be seen a chronological series of small maps of the known world at twelve various periods, with the respective States and Empires indicated by different colours on them. In most of these, India sticks to its own colour, that is to say, until it carries the colour of the British Empire. Other writers also give India a separate chapter unconnected with other styles. Fergusson has, indeed, devoted a separate volume to the subject, published in 1876.

As a brief summary of the style, it may be said that it is divided into two classes. The earliest is devoted to the worship of Buddha, a religion that not only continues to exist, but, if we may believe the description on the model of the Sanchi Tope at the India Museum, now numbers more followers than the Christian religion, though, curiously enough, none of these are in India, the land of its origin.

The other class of architecture that was developed in India is called *Hindu* or Brahminical, from the Brahmins or priests belonging to its two great sects worshipping Siva and Vishnu. Then there is *Jaina* architecture, a kind of offshoot from Buddhism, which appears to exist side by side with Hinduism.

After reading up these subjects in the books referred to, it will be worth while to visit the India Museum (on the opposite side of the road to the South Kensington Museum, and closing at four p.m.), and to measure the gateway and railing of the Sanchi Tope. These, although of stone in the original, are curiously suggestive of wooden construction, and the voluted ends of the cross beams should be borne in mind when the Ionic volute comes to be considered, later on, as referable to a wooden origin.

Another kind of tope, in the form of a column, may also be seen, namely, a pillar from Amravati, octagonal in plan, the alternate faces of which are delicately incised with a running leaf ornament, quite as well worth study as Mediæval or other more recognised examples usually followed.

There are also some oil paintings representing the rock-cut Temples, which are curiously like the nave and aisles and apsidal ambulatories of a Gothic church, though there can hardly have been any connexion between the two.

Another point to study is the form of the pillars left to support the roofs of these temples; at first square, then with the corners cut off to form an octagon, then with sixteen sides, and gradually back to the square again, and supporting an evident imitation of wooden girders, binders, and joists!

Many other native peculiarities may be studied, but there is one class of examples to be found both at the India Museum and at the British Museum (on the staircase near the main entrance), which form the one exception to the exclusive character of Indian art. There are the "Græco-Buddhist" carvings from Peshawur, anciently known as the Bactrian colony of the Greeks, whose influence on the details and carving it is most interesting to observe.

BUILDING PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

June 20, 1884.—9,246, F. W. Coons, St. Louis, U.S.A., Engraving Marble and Stone.

June 21.—9,261, J. Hobbs, Bristol, Chimney-caps or Wind-guards.—9,272, A. Kelvie, London, Clamp Window-blind.

June 23.—9,303, W. Blackshaw, Birmingham, Cart for collecting pans containing night-soil, &c.—9,308, G. W. Chambers, Rotherham, Converting ordinary Grates into Slow-combustion Grates.

June 24.—9,330, J. Parsons, Carlton, Joint for Sewage-pipes, &c.—9,331, Catlow, Burnley, Venetian Blinds.—9,332, J. Napier, Kirkintilloch, Cooking Ranges.—9,338, F. R. Wildegoose, London, Safety Sash-fastening.—9,372, W. Rockliffe, Sunderland, Latches and Locks.

June 25.—9,379, H. Shelmerdine, Liverpool, Construction of Soil-pipes, Rainwater-pipes, &c.—9,381, W. Glassey, Liverpool, Dados.—9,392, H. Knowles, Woodville, Kilns for Burning Bricks, Tiles, &c.—9,402, F. J. Nibbs, London, Roofing Tiles.—9,405, W. H. Luther, Glasgow, Sash Bars or Astragals.—9,414, J. C. Bromfield, London, Compound for Making Paving and Building Blocks, Slabs, &c.

June 26.—9,441, G. Pollard, London, Union Joints for Pipes, &c.—9,450, M. Tobin, Uxbridge, Ventilating Buildings, &c.

SPECIFICATIONS ACCEPTED.†

June 24.—32, H. H. Lake, London, Compound for Plastering or Stucco Work. Com. by H. E. Scales, Newton, U.S.A.

ABRIDGMENTS OF SPECIFICATIONS

Published during the week ending June 28, 1884.

4,944, A. C. Kennard, Falkirk, Heating Stove, (Oct. 17, '83, price 6d.)

Above the fire-box are a series of vertical chambers, through which the products of combustion ascend and descend consecutively on their way to the flue, whereby all the heat therein is retained.

5,167, E. E. Allen, London, Portable Buildings. (Oct. 31, '83, 2d.)

The frame-work of these buildings is made of wood, and between the two parts of each frame are secured sheets of corrugated metal. Double sheets may also be used, filled in between with sawdust, silicate cotton, felt, dry earth, peat, &c. (*Pro. Pro.*)

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

5,281, J. L. Stevens and C. G. Major, London, Spring Hinges for Doors, &c. (Nov. 8, '83, 10d.)

To the heel of the door is secured a shoe, which has a short vertical spindle below, on which are two arms enclosed in a box below the floor. Each arm is connected to a piston travelling in a cylinder placed on each side of the spindle, and springs bear on the pistons, which tend to force them to the further ends of the cylinders. The cylinders have two diameters, the smaller of which, at the further ends, exactly fit the pistons, and the heads of the cylinders are open. The box is filled with liquid, and when the door is opened one of the pistons is drawn out along its cylinder, the liquid passing freely round its periphery in the larger diameter of the cylinder, while the other is being forced back, compressing the liquid behind it in the smaller diameter of the other cylinder. Then the liquid acts as a cushion, and prevents any jarring or sudden motion of the piston, and therefore of the door.

7,320, J. N. Mocratti, London, Domestic Fireplaces. (Nov. 10, '83, 1s.)

Above the fire on each side are two air-mixing chambers, into which the smoke, &c., from the fire is drawn by several curved tuyere-mouths opening just above the coal. These chambers are connected together by a number of horizontal pipes arranged to form a basket, in which are placed lumps of asbestos, and the smoke, &c., issues through holes in the pipes, and comes in contact with the hot asbestos, whereby it is consumed, to assist which process also there are other tuyere-mouths, which draw in air from the room into the chambers, and thence to the pipes.

5,385, W. Walker, Birkenhead, Exhaust Ventilator. (Nov. 15, '83, 6d.)

A corrugated shaft is fitted on the top of the chimney, above which are two or more conical corrugated hollow truncated cones, one above the other, and a corrugated conical cap surmounts all. The wind striking these corrugations, passes up these cones, inducing a draught up the shaft.

5,421, E. Hurley, Birmingham, Closet-pan Apparatus. (Nov. 17, '83, 2d.)

Below the upper pan, which is the receiver, is another similar pan, into which the neck of the upper pan passes. The lower pan is connected to the drain, the outlet thereof being governed by a valve. (*Pro. Pro.*)

5,438, T. E. Bladon and W. Matthews, Birmingham, Apparatus for Ventilation. (Nov. 17, '83, 2d.)

A fan is used, which has inclined vanes, which when the fan is revolved drives the foul air away through a tube.

MEETINGS.

WEDNESDAY, JULY 9.

Parkes Museum of Hygiene. — General Meeting, to receive report from Council, &c. 5 p.m.

THURSDAY, JULY 10.

International Health Exhibition (*Conference of the Royal Institute of British Architects*).—At 2 p.m. (1), Professor T. Roger Smith "On the Construction of Houses with regard to Sanitary Arrangements"; (2), Mr. Fred. W. H. Hunt on "The Sanitary Arrangements of Houses in London during the last Eighty Years." The discussion upon these two papers to be opened by Prof. Kerr.—At 4 p.m., Mr. S. Flint Clarkson on "Drainage under Dwellings." The discussion upon this paper to be opened by Mr. Thos. Worthington.—Mr. Ewan Christian, Chairman for the day; Mr. Charles Barry, Vice-chairman.

Association of Municipal and Sanitary Engineers and Surveyors.—Annual Meeting, to be held in the Town-hall, Newcastle-on-Tyne. 11 a.m. (1) Annual Report. (2) President's Address. (3) Paper by Mr. J. P. Spencer, F.R.S., on "Inspecting and Testing the Sanitary Arrangements of Houses."

FRIDAY, JULY 11.

International Health Exhibition (*Conference of the Royal Institute of British Architects*).—At 2 p.m. (1), Mr. Edward C. Robins, F.S.A., on "The Impermeable Construction of Roofs, Walls, and Basement Floors, with a Reference to Ventilation and Warming incidental thereto"; (2), Mr. John P. Seddon on "The Construction of Chimneys." The discussion to be opened by Mr. C. Forster Hayward.—At 4 p.m., Mr. Horace Jones on "A Suggestion with regard to the Construction of Doors, so as to afford opportunity of Escape from Fire; and another on an Economical Mode of Fireproof Construction adopted in several instances in Public and Private Buildings." The discussion to be opened by Mr. Henry Dawson. Mr. George Godwin, F.R.S., Chairman for the day; Mr. Alfred Waterhouse, A.R.A., Vice-chairman.

Association of Municipal and Sanitary Engineers.—Meeting at Newcastle, continued. 10 a.m. (1) Mr. James Hall on "Steam on Tramways." (2) Lieut.-Col. Jones, V.C., on "Sewage Disposal." (3) Mr. F. S. Brunton on "The Cost of Local Government and the Distribution of the Funds."

SATURDAY, JULY 12.

International Health Exhibition (*Conference of the Royal Institute of British Architects*).—At 2 p.m. (1), Mr. George Aitchison, A.R.A., on "The Sanitary Aspect of Internal Fittings and Decoration"; (2). Mr. William White, F.S.A., on "The Hygienic Value of Colour." The discussion to be opened by Mr. T. W. Cutler.—At 4 p.m., Mr. Thomas H. Watson on "The Collection, Storage, Management, and Distribution of Water, for Domestic Purposes, within the House." The Right Hon. A. J. B. Beresford Hope, M.P., Chairman for the day; Professor T. Hayter Lewis, Vice-chairman.

Association of Municipal and Sanitary Engineers.—Meeting at Newcastle, continued. 10.30 a.m., Closing Business. 11 a.m., Visits to various works.

Miscellanea.

Tiverton Drainage.—After considerable delay the Town Council of Tiverton (acting upon the report of Mr. E. Pritchard, M. Inst. C.E., to whom the competition drawings were submitted) have awarded the premium of 25*l.* to Messrs. Gotto & Beesley, of Westminster, for their scheme for the disposal of the sewage of the town by irrigation, at a cost of 3,500*l.*

Society for Improving the Condition of the Labouring Classes.—The fortieth annual meeting of this society was held at Willis's Rooms last week, under the presidency of the Earl of Shaftesbury. The report of the committee showed that the society was the first to step into the gap to provide improved dwellings for the poor, and although their progress had been slow, their efforts had been crowned with beneficial results, as the report upon the condition of the society's houses showed that the houses were in good repair, and the superintendent's reports were very satisfactory. It also stated that the model dwellings in Streatham-street, Bloomsbury, for fifty-four families, had been fully occupied. Portpool-lane model houses, for twenty families and 128 single women, reported as a rule all the houses and rooms let; the public washhouse returned 23,906 washers. The Dyott-street (late George-street), Bloomsbury, lodging-house, for 104 single men, returned an average of ninety-eight. Macklin-street lodging-house, for seventy-two single men, had averaged sixty-four nightly inmates. The renovated dwellings, Wild-court, Drury-lane, fifty-two rooms had been fully tenanted. Clark's-buildings, St. Giles, for seventy-eight families, returned an average tenancy. Great St. Andrew-street, St. Giles, renovated houses for families, reported generally good occupation. The rate of mortality throughout the houses was 15 per 1,000. The report having been adopted, Lord Shaftesbury said that the society was an admirable institution, and if its work had been carried on as originally intended, many of the evils would have been removed. Although the condition of the London poor was far better than formerly, there still remained much to be done. If the people were better housed their whole condition would be improved. In the course of a few years London might be made to present a very different aspect if capitalists would advance money for building purposes, and be content with a return of four per cent.

The City Companies Commission.—The report of the Commission of Inquiry into the Livery Companies of the City of London has now been presented to her Majesty. After detailing the history of the various companies, the report concludes with "Suggestions as to Reform," among which are the following:—"4. We recommend the appointment by Act of Parliament, of a Commission, which shall undertake, pursuant to the terms of such Act, (1) the application of a portion of the corporate incomes of the companies respectively to objects of acknowledged public utility; (2) the better application of the trust incomes of the companies; (3) should it prove practicable, the reorganisation of the constitution of the companies. 5. We are of opinion that by the terms of such Act 'objects of acknowledged public utility' shall be defined as follows: — (1) Scholastic and scientific objects, *i.e.*, elementary education, secondary education, classical education, scientific research. (2) General public purposes, *e.g.*, hospitals, picture galleries, museums, public libraries, public baths, parks, and open spaces. (3) The improvement of workmen's dwellings, and, where the companies represent trades, subsidies to the benefit societies of such trades. 6. We are of opinion that, having regard to the facts that (1) the companies are connected with the municipality of London; (2) their wealth is in the main the result of the remarkable progress of London, the objects of acknowledged public utility to be promoted should be mainly metropolitan objects, but that, in cases in which a trade formerly carried on in London has established itself elsewhere, similar objects connected with the present place of trade may properly be included."

An Island for Sale.—An estate in a ring-fence has always been esteemed a desirable acquisition, but at the present time the unusual opportunity is offered of purchasing an estate entirely bounded by the sea, inasmuch as the island of Herm, which is about a mile and a half in length by three-quarters of a mile in breadth, and contains about 460 acres, is announced to be sold by auction on the 29th of July by Messrs. Debenham, Tewson, & Co., who have sent us particulars of the property. It is one of the smallest of the Channel Islands, and enjoys a delightful climate. The purchaser will at once become "monarch of all he surveys," and will have about forty subjects on his island.

Destruction of the Theatre Royal, Edinburgh.—The Theatre Royal, in Broughton was, on Monday last, destroyed by fire, happily without loss of life or other serious catastrophe. The fire broke out at midday in the property-room, at the opposite end from the stage, but how it originated does not appear. The progress of the fire was very rapid, and so speedily did it get a firm hold of the building that the efforts of the fire-brigade were directed mainly towards saving the adjoining property. The Roman Catholic pro-cathedral, which adjoins the theatre to the north, had a narrow escape, having twice caught fire, but, by the prompt attention of the firemen, the flames were prevented from getting firm hold. By the exertions of the clergy and other willing assistants, the valuable properties in the church (including the "Dead Christ," by Vandyck, valued at 5,000*l.*) were saved. The theatre was valued at about 13,000*l.*, and the estimated damage is altogether supposed to be about 18,000*l.* or 20,000*l.* The site of this theatre was during the first quarter of the century occupied by a concert-hall, under the direction of Natali Corri; in 1829 it was converted into a theatre known as the Adelphi, which was consumed by fire in 1853. Re-constructed in 1855, under the name of the Queen's Theatre and Opera-house, it was again burned down in 1865; re-built the following year, under the designation of the Theatre Royal, it was a third time burned down in 1875. Upon the occasion of the last fire, the elevations of the building remained intact, and the interior was fitted up under the direction of Mr. Phipps.

The Crypt of Hexham Abbey Church.—Some of the passages of this ancient crypt, which have previously been unopened, have been cleared of the *débris* which hid them from view, and laid open to inspection. The steps by which the crypt was entered from the outside (on the west side of the church) have been brought to daylight; and in the crypt many stones of Roman masonry have been freed from the Saxon cement which covered them, which adds still further to the interest of this underground chapel. One of the passages which has just been opened evidently led back to the building above, known as St. Wilfrid's Church, but the point of egress is at present covered by the base of the massive pillars of the tower and the aisle in the transepts of the present church, so that it would appear that the priests had a separate door by which they could enter the crypt, and that there were other doors by which other persons not so privileged could enter. Perhaps the most interesting Roman stone in the crypt is that which formed part of a Roman altar, and from the inscription upon which the name of the Emperor Geta was erased at the command of his half-brother, the Emperor Caracalla, after the assassination of the former. —*Newcastle Chronicle.*

The Parkes Museum.—A general meeting of the members of the Parkes Museum will be held in the Museum, 74A, Margaret-street, Regent-street, on Wednesday evening next, July 9th, at five o'clock, p.m. His Grace the Duke of Westminster, K.G., vice-president of the Museum, has intimated his decision of being present. The following is the business to be transacted:—1. To receive report from Council on general work of the museum; 2. To receive statement of accounts; 3. To elect vice-president: George Buchanan, M.D., proposed.

Mr. W. H. Dalton, the last of the original members of the Metropolitan Board of Works, died last week at the age of seventy-five. At the time of his death he was the representative at the Board of the parish of St. Martin-in-the-Fields, which parish he had represented since the formation of the Board in 1855.

The Forestry Exhibition, Edinburgh.—The opening of the International Forestry Exhibition took place on Tuesday last, under somewhat unfavourable circumstances, the arranging of the exhibits being, as is too commonly the case on similar occasions, greatly in arrear.

The New Bridge at Putney. — At the meeting of the Metropolitan Board of Works, on the 27th ult., it was announced that the Prince and Princess of Wales had consented to lay the foundation stone of Putney Bridge on Saturday next, July 12, at four o'clock.

The City and Southwark Subway Bill. The Committee of the House of Lords, presided over by Lord Romilly, passed, on the 27th ult., the London (City) and Southwark Subway Bill, authorising a subway under the river from King William-street to the Elephant and Castle.

The Water Supply of Venice. — That ancient cause of grumbling among residents and holiday tourists, the undrinkable water of Venice, appears, from the report of our Vice-Consul, Mr. De Zuccato, to be now at an end. Eight years ago a concession for bringing water from the mainland was granted to an association of English capitalists, who subsequently transferred it to a French company, by whom the project has just been brought to completion at a cost of five millions of francs. The great aqueduct passes under the Lagoons. By the terms of the arrangement the municipality pays the water company 100,000 francs a year for the supply of good water to the 120 public wells in the city, which are to remain open three hours a day; but after sixty years the whole of the waterworks will become the property of the city. Private families are supplied with water at the price of about sixpence (60 centesimi) per thousand litres, equal to about 240 gallons.—*Daily News.*

Roman Remains at Woolstone.—In the course of his researches on the site of the lately-discovered Roman villa at Woolstone, Mr. R. Walker, of Uffington, has found what he believes to be "a depository for the remains of the dead previous to cremation, similar to the exquisite archæological treasure now moved to Oxford." He has discovered indications of three distinct houses, and has also marked the traces of at least half a dozen others, including one with indubitable tokens of the bath-room. In another locality he has found no less than six or eight houses, nearly parallel, as if forming a street east to west, the foundations of which are clearly discernible. Beyond this other fields are disclosing glass, pottery, iron, and what Mr. Walker "noted as an interesting fact in the Church Field," the presence of a large deposit of oyster shells (real natives),—denoting a luxury of living, and the probable chance of finding rich pavements on a thorough search." —*Reading Mercury.*

Disused Burial-Grounds as Public Gardens. — The Metropolitan Public Garden and Playground Association deserves well for its efforts to add to the pleasures and improve the stamina of city children. The conversion of old and disused burial-grounds into open spaces for recreation, which is one of its leading principles, has much that can be said in its favour and is open to no valid objection. It implies no neglect or desecration of those whose remains formerly rested there, inasmuch as their elements have years ago become part of the dust out of which they came. Their very memorials in many cases have perished, as they must at length, crumbled away by the hand of Time. Neither does hygiene require that these spots should continue to be the neglected abode of rank grass and weeds alone. Let it be granted that urban burial-grounds were a mistake of a former generation; they have wrought their evil, doubtless, and have ceased to be effective long before now. The period which has intervened since the abolition of intramural graveyards is sufficient to have purified by disuse the most unwholesome of them.—*Lancet.*

The Ashmolean Museum, Oxford.—Mr. A. Evans, M.A., of Brasenose College, has been elected Keeper of the Ashmolean Museum, in the place of the late Mr. J. H. Parker, C.B. The keeper is now required to deliver lectures as well as to superintend the collections of the museum.

International Health Exhibition. — A Grand Evening Fête, under the immediate patronage of their Royal Highnesses the Prince and Princess of Wales, who have announced their intention of being present, will be held at the International Health Exhibition, on Wednesday, July 23rd, in aid of the Fund for the London Hospitals.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered	Page
Dairy Homestead	British Dairy Farmers' Association	Not stated.	August 25th.	ii.

Nature of Work.	By whom required.	Premium.	Designs to be delivered	Page.
.....	.....	.....	.....	.....

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect Surveyor, or Engineer.	Tendrs to be delivered.	Page.
Blinds, Croydon Infirmary	Guardians	.....	July 7th	xxviii
New Dwellings, St. Catherine's	Corporation of Trinity House	*Official*	do.	ii.
Broken Granite	Bermondsey Vestry	do.	do.	xxiv.
Painting, Anglesea Barracks, Ptsmth	War Department	do.	July 8th	ii.
Making-up Roads, Battersea	Wandswrth B. of Wks	do.	do.	xxiv.
Concrete Invert, Kerbing, & Asphltng	Tottenham Local Bd.	De Pape	do.	xxiv.
Road Making, &c.	Fulham Bd. of Wks.	*Official*	July 9th	ii.
Granite, Flints, &c.	Hendon R. S. A.	do.	do.	ii.
Road Making, Footscray	Bromley R. S. A.	do.	July 10th	xxviii
Granite Spalls	Brighton Town Cncl.	P. C. Lockwood	do.	xxvi.
Police Station	do.	do.	do.	xxvi.
Underground Reservoir	Epsom Local Board	*Official*	July 12th	xxvi.
Stoneware Pipes and Draining Tiles	Cor. of Brtn-on-Trent	J. Mansergh	July 14th	xxviii
Brick Sewer	Paddington Vestry	*Official*	do.	xxvi.
Additions to Goods Shed, Bridgend	Great Westrn Ry. Co.	do.	July 15th	ii.
Cleaning out Docks, Brentford	Local Board	Lacey	do.	xxviii
Memel Deals	Norwich Corporation	P. P. Marshall	do.	ii.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tendrs to be delivered.	Page.
Station, &c. Gateshead	North-Eastrn Ry. Co.	W. Bell	July 16th	ii.
Whitewashing, &c. Exeter Barracks	War Department	*Official*	do.	ii.
Alterations, &c. to Workhouse	Grdians of Poplr. Un.	George Morris	July 18th	xxviii
Retort House, Brentwood	Gas Company	Jabez Church	July 19th	xxviii
Station, Buildings, &c. Liverpool	Lan. & Yorks. Ry. Co.	H Shelmerdine	July 21st	ii.
Broken Granite	Maidstone Local Bd.	F. J. C. May	do.	ii.
Wood Paving	Vestryof St. James', Westminster	*Official*	July 24th	xxvi.
Brick Sewer	Gravesend U. S. A.	do.	August 1st	xxvi.
Guernsey Granite	Governors	J. P. Power	August 4th	xxiv.
School Buildings and Master's House Newbury	Bombay Municipality	C. B. Braham	August 6th	ii.
Cast-Iron Pipes	Committee	C. L. Luck	Not given	xxviii
Additions, &c. to Schools, N. Hmptn	Proprietor	J. J. Lish	do.	ii.
Additions to Mansion, near Barnet	W. H. Wheeler	Not given	do.	xxvi.
Rail Road	.....	Sanson	do.	xxvi.
Stonework and Ironwork, Mark-lane	.....	Gordon & Lowther	do.	xxvi.
Completing Houses and Shops				

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Applications to be in.	Salary.	Page.
County or District Surveyors in Ireland	Civil Service Commis.	August 1st	Not stated.	xxii.

Nature of Appointment.	By whom Advertised.	Applications to be in.	Salary.	Page.
Road Foreman	Tottenham Local Board	July 8th	120*l.*	xxii.
Waterworks Engineer	Alnwick, &c. Local Brd.	July 19th	Not stated.	xxiii.

TENDERS.

For building sessions court, police-courts, &c., for the Corporation of Birkenhead. Messrs. Thomas D. Barry & Son, Liverpool, architects. Quantities by Mr. George Paton, Salford, Manchester:—

S. & W. Pattinson, Ruskington, Sleaford	£31,837 0 0
Wm. Thornton & Sons, Liverpool	30,992 0 0
John Miller, Liverpool	30,932 0 0
W. H. Forde, Birkenhead	30,502 16 5
Joseph Bull, Sons, & Co., London	30,033 0 0
Thomas Urmson, Liverpool	29,782 0 0
Brown & Backhouse, Liverpool	29,693 0 0
Hugh Yates, Liverpool	29,467 0 0
Wm. Wainard, Wigan	29,360 0 0
Samuel Webster, Bootle	29,331 0 0
Edmund Gabbutt, Liverpool	29,228 0 0
James Leslie, Bootle	29,217 0 0
Alexander Bleakley & Son, Birkenhead (accepted)	28,890 0 0

For Cullum House, Lime-street. Messrs. N. S. Joseph & Pearson, architects. Quantities by Mr. Stephen Barton Wilson:—

Conder	£9,678 0 0
Williams	9,473 0 0
Bywaters	9,233 0 0
Lawrence	9,239 0 0
Pritchard	9,180 0 0
Patman & Fotheringham	9,173 0 0
Colls & Sons	9,140 0 0
Ashby Bros.	8,983 0 0
Brass	8,981 0 0
Hall, Beddall, & Co.	8,789 0 0
Patrick	8,758 0 0
Scrivener	8,574 0 0
Ashby & Horner	8,540 0 0

Accepted for repairs to Nos. 1 to 5, Oliver-road, Leyton, Essex. Mr. William C. Livermore, surveyor:—

A. Nicholls, Leytonstone	£185 0 0

Accepted for reinstating house and warehouse, damaged by fire, at 39, Cable street, St. George's-in-the-East. Mr. William C. Livermore, surveyor:—

A. Nicholls, Leytonstone	£435 0 0

Accepted for the construction of brick and pipe sewers, and laying down new granite carriage-ways and York stone footways in the streets embraced in the Pear Tree-court, Clerkenwell (Artisans' Dwellings) Scheme, for the Metropolitan Board of Works:—

Mowlem & Co.	£2,890 0 0

For alterations to the "Bodega Company's" premises, High-street, Borough. Mr. W. Macie Leir Seaman, 3, Chancery-lane, architect. Quantities prepared by the architect:—

Structural Alterations, Counters, and Mahogany Work and Fittings.	
Drew & Cadman, Holborn	£759 0 0
Patman & Fotheringham, Theobald's-road	650 0 0
T. Beale, Westminster	598 0 0
C. F. Hewlitt, Minories (accepted)	520 0 0
Jackson & Todd, Hackney	469 0 0
Hewlitt (accepted)	475 0 0
Jackson & Todd	462 0 0
Pewterers' Work.	
T. Heath (accepted)	121 3 8

For rebuilding premises in High-street, Sheerness-on-Sea, for Mr. D. Prosser. Messrs. P. P. Perry & W. Macie L. Seaman, architects, 3, Chancery-lane. Quantities prepared by Mr. W. Macie L. Seaman:—

—	Ham Hill Stone Dressings. £ s. d.	Bath Stone Dressings. £ s. d.	Ham Hill Dressings, omitting Tower. £ s. d.
A. Steer, Norwood	2,886 17 7	2,865 0 11	2,726 14 3
Amos & Foad, Whitstable-on-Sea	2,750 0 0	2,650 0 0	2,605 0 0
Eli Tinson, Kensington	2,643 0 0	2,567 0 0	2,455 0 0
Stimson & Co., Brompton	2,628 0 0	2,598 0 0	2,480 0 0
Paramor & Sons, Margate	2,530 0 0	2,466 0 0	2,398 0 0
W. Martin, Ramsgate	2,475 0 0	2,457 0 0	2,355 0 0
L. Seager, Sittingbourne	2,465 0 0	2,424 0 0	2,360 0 0
G. White,* London	2,251 3 9	2,201 3 9	2,000 0 0

* Accepted.

For completing six houses, Rosslyn-gardens, Hampstead, for Mr. T. A. Amos. Messrs. Spalding & Auld, architects:—

L. H. & R. Roberts	£4,062 0 0
J. Outhwaite & Son	3,980 0 0
A. & E. Lea	3,973 0 0
Donne	3,834 0 0
T. Russell (accepted)	3,500 0 0
Stephenson	3,483 0 0

For painting, whitewashing, &c., at the St. Marylebone Infirmary, Notting-hill, for the Guardians of the Poor of the Parish of St. Marylebone. Messrs. H. Saxon Snell & Son, architects, 22, Southampton-buildings:—

Smith & Saunders]	£190 0 0
J. H. Jolliffe	186 0 0
Wall Bros.	183 0 0
A. W. Derby	163 0 0
M. McCarthey	160 0 0
M. & M. Fleming	160 0 0
Sheerman & Sons	160 0 0
Vigor & Co. (accepted)	153 10 0

For making up, metalling, and channelling of roadway, and tar paving of pathways, at Manor Park-road, Harlesden, for the Willesden Local Board. Mr. O. Claude Robson, engineer:—

Pizzey	£1,292 0 0
Nowell & Robson	1,183 0 0
Catley	1,135 0 0
Tomes & Wimpey	1,005 0 0
Neave & Son	985 0 0
Felton (accepted)	895 0 0

For erecting fifty labourers' dwellings, on the Cann Hall Estate, Leyton. Mr. G. H. L. Stephenson, architect:—

Evans	£11,437 0 0
Read	9,800 0 0
Wilson	9,250 0 0
Sladwell	9,250 0 0
Wayman	8,900 0 0
Wire (accepted)	8,750 0 0

For constructing 1,400 ft. brick sewer, in Bridge-road, Hammersmith, and 3,200 ft. brick sewer, at Stamford Brook East, near Willesden Junction, for the Metropolitan Board of Works:—

George Felton,* Iverson-road, N.W. (accepted)	£8,353 0 0

* Lowest Tender of thirteen received.

For alterations and additions to "Coleyhurst," Bath-road, Reading, for Mr. Thos. Rogers. Mr. W. Ravenscroft, Reading, architect. Quantities by Messrs. Cooper & Sons, Reading and Maidenhead:—

Wheeler Bros., Reading (accepted)	£1,784 5 0

For the erection of a new tobacco factory, for Messrs. W. D. & H. O. Wills, Bedminster, Bristol. Mr. Frank W. Wills, architect—

A. J. Beaven,* Bristol	£17,480 0 0

* Accepted, but reduced to 15,710*l.*; the lowest but one of nineteen Tenders received.

For alterations to 19, Pelham-street, Nottingham, for Mr. A. Stedall. Mr. George Edwards, architect:—

Morrison	£1,120	0	0
Hind	947	0	0
Woodsend	850	0	0
Martin, Wells, & Co.	790	0	0
Bell & Son	752	0	0
Stimpson & Co.	713	0	0
Scharien & Williams (accepted)	694	0	0
Vickers (exclusive of desk and railings)	690	0	0

For cold water tanks, at the New Wandsworth and Clapham Workhouse. Mr. Thos. W. Aldwinckle, architect, East India-avenue, E.C.:—

Thames Bank Iron Company	£987	10	0
Z. D. Berry & Sons	850	0	0
Appleby	810	0	0

Accepted for erecting six cottages, and workshop in rear, situate in Grove-street, Deptford, for Mr. Frank Barnes, Mr. Henry Roberts, architect and surveyor:—
Hubble & Trott, Deptford.

Cottages	£1,195	0	0
Workshop	87	0	0

[Except bricks.]

For the erection of cemetery chapel, for the Corporation of St. Alban's:—

F. W. Austen, St. Alban's	£855	0	0
W. Sparrow, Kettering	818	10	0
C. Chamberlain, St. Alban's	815	0	0
Marcus Holland, St. Alban's	813	0	0
J. & W. Savage, St. Alban's	809	11	0
W. C. Haselgrove, Luton and St. Alban's (accepted)	799	0	0

For alterations at the White Bear public-house, Kennington, for Mr. S. Bannell. Mr. H. I. Newton, architect, 17, Queen Anne's-gate:—

Burman & Son	£733	0	0
Pewterers' Work.			
Matthews	99	0	0

For alterations at the Windsor Castle public-house, Victoria, S.W., for Mr. S. Raven. Mr. H. I. Newton, architect, 17, Queen Anne's-gate:—

Shurmur	£1,170	0	0
Cook	1,047	0	0
Godden	975	0	0
Lamble	887	0	0
Royal	869	0	0
Steel Bros. (accepted)	849	0	0
Pewterers' Work.			
Warne	£51	10	0
Hellings	42	12	6
Heath (accepted)	41	0	0
Gasfittings.			
Winn (accepted)	180	0	0

For alterations and repairs to 76, Brecknock-road. Mr. E. Hide, architect, 121, Bishopsgate-street:—

Ward & Lamble	£250	0	0

[No competition.]

For new house, cottage, meter-house, &c., for the Newmarket Gaslight and Coke Company, Limited. Mr. John Flatman, Newmarket, architect:—

Linyell Bros., Newmarket	£1,997	0	0
Smith, Newmarket	1,965	0	0
Hook & Tebbit, Soham	1,923	0	0
Kerridge & Shaw, Cambridge	1,921	0	0
Rednall, Bury St. Edmunds	1,817	0	0
Simpson & Son, Newmarket	1,814	0	0
Cowell, Soham	1,799	0	0
Saint & Sons, St. Ives (accepted)	1,653	0	0
Mills, Cambridge	1,537	0	0

For new water-closets and drainage, for the Harrow School Board. Messrs. Ernest George & Peto, architects:—

A. Webb	£347	10	0
Kindell	345	0	0
Batchelor (accepted)	340	0	0
W. Bindon	329	6	0

For the erection of malting cellars, at Watford, for Messrs. Benskin & Co. Mr. Arthur Kinder, architect, 11, Queen Victoria-street. Quantities by Mr. Howard, Martin's-lane, Cannon-street:—

Andrews & Son	£5,998	0	0
Greenwood	4,899	0	0
Neal	4,857	0	0
Turner	4,694	0	0
Pratt	4,258	0	0
Waterman (accepted)	4,217	0	0
Hailey	3,930	0	0

For the erection of two pairs of semi-detached villas, on the Craven Park Estate, Harlesden, for Mr. W. Hyde. Mr. T. F. Shaw, architect, Harlesden. Quantities prepared by the architect:—

Beech	£3,422	0	0
Martin	3,400	0	0
Turner Bros.	3,200	0	0
Holt	3,200	0	0
Parfitt	3,074	0	0
Page	3,050	0	0
White	2,872	0	0
Spicer	2,842	0	0
Ridout	2,790	0	0
Dennett & Foote	2,620	0	0
Egan	2,571	0	0

For building new parish room in connexion with All Saints' Church, Clifton, Bristol. Mr. E. H. Edwards, architect:—

Bastow	£2,703	0	0
R. J. Crocker	2,569	0	0
A. J. Beaven (accepted)	2,428	0	0

For building new choir schools, in connexion with All Saints' Church, Clifton, Bristol. Mr. E. H. Edwards, architect:—

Bastow	£1,599	0	0
Crocker	1,582	0	0
Belmont	1,494	0	0
Cowlin & Son	1,470	0	0
A. J. Beaven *	1,450	0	0
W. G. Summons	1,423	0	0

* Accepted, but reduced.

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

TO CORRESPONDENTS.

W. A. C. (parcel received).—H. P.—W. W. L.—W. W. N.—J. T. C.—W. H. B. & Co.—R. P. (we will make a point of looking into the matter, but can do nothing this week).—C. F. A, V.—F. F.—R. W. R.—G. and S.—W. S.—H. G. (it is a matter of supply and demand, and will take care of itself).

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVI. (January to June, 1884) will be given as a Supplement with our next Number.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING-CASES (Cloth), with Strings, to hold a Month's Numbers, price 2s. each.

THE FORTY-SIXTH VOLUME of "The Builder" (bound), will be ready shortly, price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS,
Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.
FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to
DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

Box Ground Stone
Is the Best for Use in all Exposed Positions, being a well-known and tried Weather Stone.
50,000 feet cube in stock.
PICTOR & SONS, BOX, WILTS.
[ADVT.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [ADVT.

Doulting Free Stone
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90 Cannon-street, E.C. [ADVT.

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MANUFACTURERS OF IMPROVED
STEAM AND HOT-WATER APPARATUS,
FOR WARMING AND VENTILATING
Private Houses, Churches, Schools, Hospitals, Manufactories, Greenhouses, &c.
OFFICES AND SHOW-ROOMS:—
No. 34, UPPER GLOUCESTER PLACE, DORSET SQUARE, LONDON, N.W.
And at DUBLIN, BELFAST, GLASGOW, and NEWCASTLE.
Illustrated Pamphlet on "Heating" post free.

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ARTIFICIAL LIGHT REFLECTORS.

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N.B.—For Prospectuses and Diagrams, address Stamped Envelope to

P. E. CHAPPUIS, Patentee and Manufacturer, 69, FLEET-STREET, LONDON.

NOTICE.—The POLYGONAL REFLECTOR (Latest Patent) FOR ARTISTIC and PICTURE GALLERIES.
Its construction allows of the angle of light being readily altered so as to reflect in any desirable direction.

N.B.—On View at HEALTH EXHIBITION (Eastern Gallery).